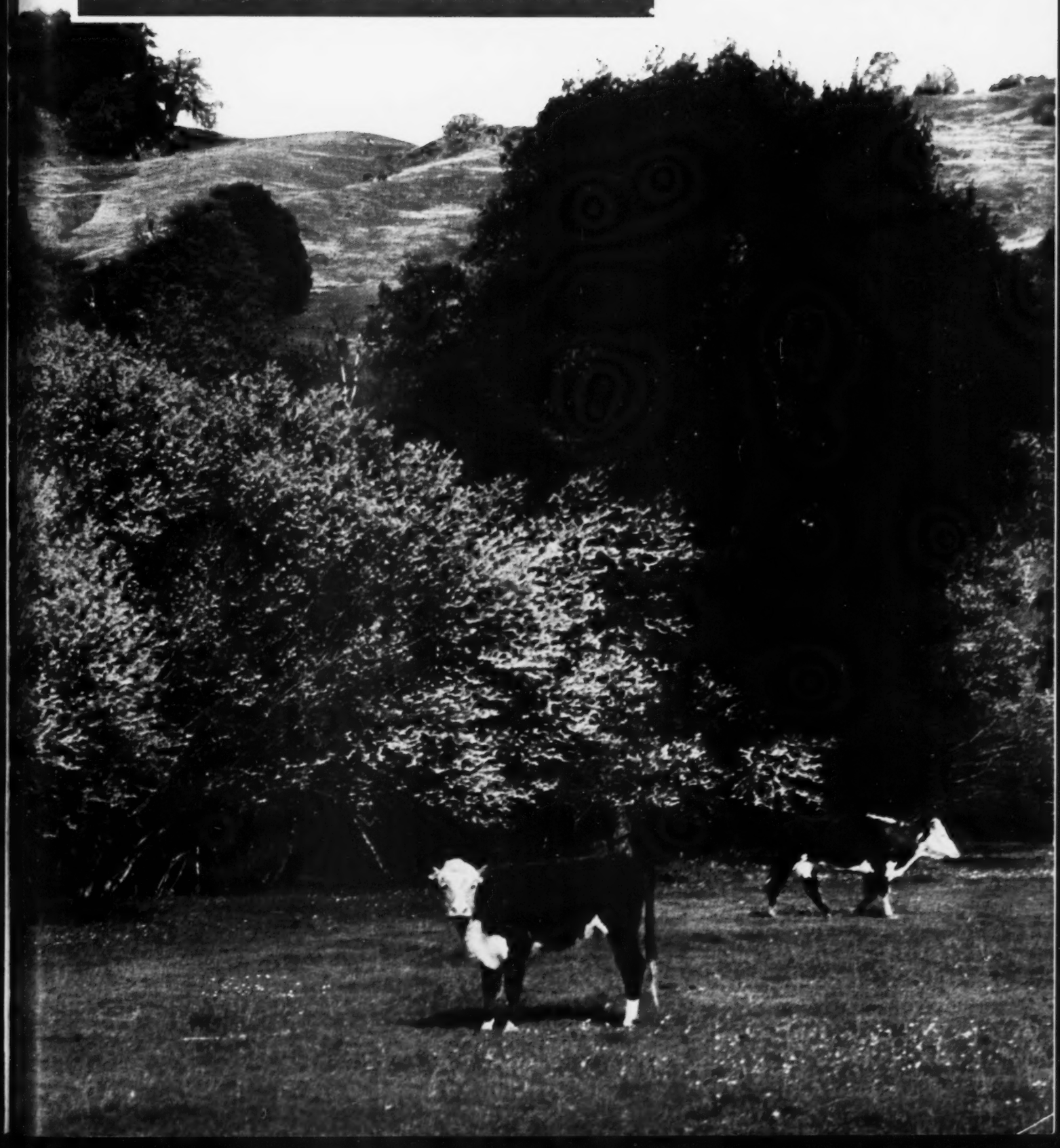
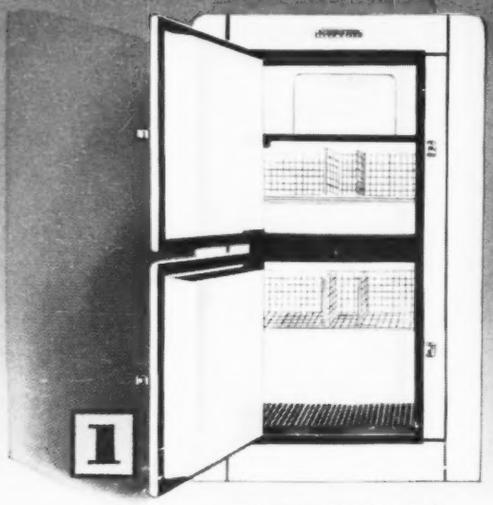
# The Farm

## QUARTERLY

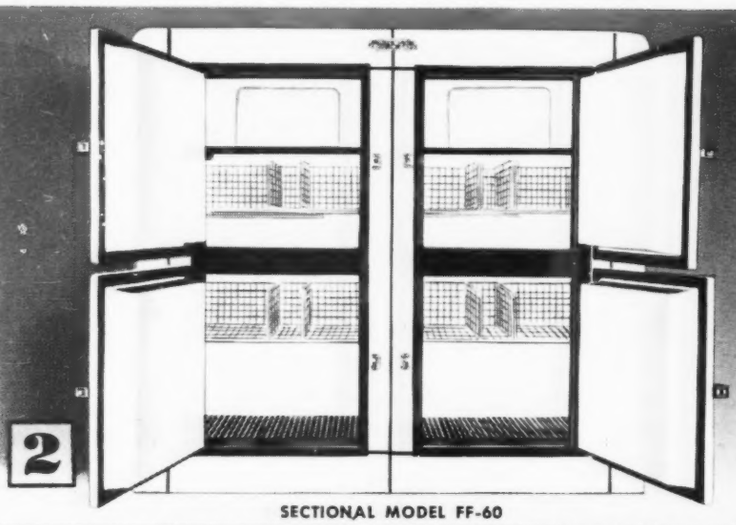
SPRING 1948 • PRICE 50 CENTS



# NOW...
# FARM FREEZER FLEXIBILITY...
## *THE SIZE YOU NEED...AS YOU NEED IT*
# WILSON ZERO°SAFE
SECTIONAL MODELS



SECTIONAL MODEL FF-30

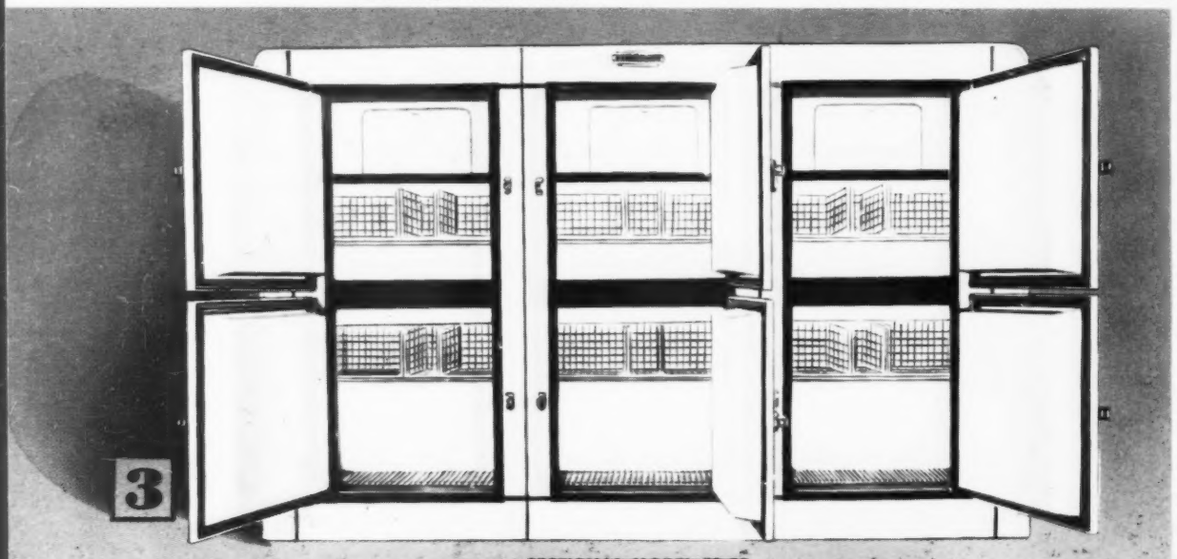


SECTIONAL MODEL FF-60

**1** Wilson sectional models are of time-tested design—efficient, rugged, economical to operate. The FF-30 model alone has capacity for over 1,000 pounds of food yet is less than four feet in width and three feet in depth.

**2** When the need for increased freezer capacity arises, it is easy to make another standard Wilson section an integral part of your Zero°Safe. Each section is fully portable, quickly put into permanent position.

**3** With Wilson FF-90—or even larger—(you can build to FF-120 for over 4,000 pounds storage capacity) only space for the assembled cabinet plus room for remote installation of condensing unit is needed.



SECTIONAL MODEL FF-90

Wilson sectional models of Zero°Safe freezers are designed to meet the expanding requirements of today's homes of plenty in a land of plenty. Since many who purchase freezers for the first time are inclined to under-estimate their needs, or prefer to start out on a modest basis, Wilson sectional models are the perfect answer. Through them farm freezer flexibility is possible—as your requirements grow, standard portable Wilson sections can be added. Another reason why Wilson Zero°Safe is proving indispensable to better living for thousands.

Write for this wonderful and complete free booklet containing full information on the selection, packaging, freezing and storing of foods.

**WILSON REFRIGERATION, INC.**
DIVISION OF WILSON CABINET CO., INC.
SMYRNA, DELAWARE

***In 1947 we introduced the NEW small FARMALL CUB***

# *Now,* in 1948 Comes the New FARMALL C

## WITH TOUCH-CONTROL

**"FINGERTIP-TOUCH"**
Now, for the first time, here's a *complete* implement control. Effortless, instantaneous, selective. Two-way hydraulic power that not only lifts the implement but also forces it down. Just a fingertip touch of the tiny control levers gives you *any* operating adjustments you want.

INTERNATIONAL HARVESTER leadership in all-purpose farm tractor development scores again!

Here are two new members of the famous Farmall Family—FARMALL C and FARMALL Super-A, both equipped with Farmall TOUCH-CONTROL, the new two-way hydraulic control that's effortless and instantaneous.

The Farmall C is designed for diversified farms of approximately 120 crop acres; for larger vegetable farms; and for large farms that need an extra tractor.

There's balanced, smooth-flowing power in the Farmall C. And there's a full line of matched, direct-connected, hydraulically-controlled, quick-change implements especially designed for it.

## and the FARMALL SUPER-A

### WITH TOUCH-CONTROL

Introduction of the Farmall Super-A with Touch-Control brings a new, efficient farm-work unit to farms of up to 80 crop acres. It's also designed as a handy, all-purpose utility tractor for larger farms. "Combustion control" resulting from a newly designed cylinder head gives the Farmall Super-A amazing pep and efficiency.

The Farmall Super-A has a full line of matched implements—all of them new and revolutionary in design—all hydraulically controlled. They're *fitted* to the tractor, to do your work better, faster, easier.

See the Farmall Super-A and the Farmall C, both with Touch-Control, at your IH Dealer's store.

**INTERNATIONAL HARVESTER COMPANY**
180 North Michigan Avenue Chicago 1, Illinois

*Good Listening!*
*Hear James Melton on "Harvest of Stars" Sundays, NBC Network.*

FARMALL is a registered trade-mark. Only International Harvester builds Farmall Tractors

**FARMALLS FIT EVERY FARMER'S NEED**

*Hub caps at extra cost when available.*

## *Excitingly MODERN! Strikingly DIFFERENT!*

**☆ 2 NEW BIG JOBS!**

Biggest Ford Trucks ever built! 145 H.P. engine! Up to 21,500 lbs. G.V.W.! Up to 10.00-20 tires!

**☆ NEW MILLION DOLLAR TRUCK CAB!**

With living room comfort! Biggest contribution to driver comfort in 20 years! New 3-way air control. New coach-type seats. New picture-window visibility! New Level Action cab suspension!

**☆ 3 NEW TRUCK ENGINES!**

A new Six, two new V-8's! Most modern engine line in the truck field! Up to 145 H.P.! High turbulence combustion chambers! New Loadomatic ignition! 4-ring pistons!

**☆ OVER 139 NEW MODELS!**

Widest job coverage in Ford Truck history! Cab-Over-Engine and conventional chassis! Panel, Pickup, Express, Stake and Platform bodies! G.V.W. ratings 4,700 lbs. up to 21,500 lbs.

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## Hottest truck line in history...from the Leader in Trucks Built and Trucks in Use!

Our trucks are red-hot! That's because they're brand new! Ford *Bonus Built* Trucks for '48 are brand new in every important way but one!

Big exception is truck-building know-how! That isn't new with us! We've been building trucks . . . and we've built more trucks than anyone else . . . for over 30 years! We've picked up more truck know-how than anyone else!

From a combination of the NEW in truck engineering and the KNOW-HOW of truck experience, you get new thrift! . . . new performance! . . . new reliability!

In Ford Trucks you get *Bonus Built* construction, the extra strength that pays off two ways. First, Ford *Bonus Built* Trucks are not limited to just one job, but are good all-around workers in a wide range of jobs. Second, Ford Trucks last longer. Life insurance experts *certify* proof that Ford Trucks last up to 19.6% longer!

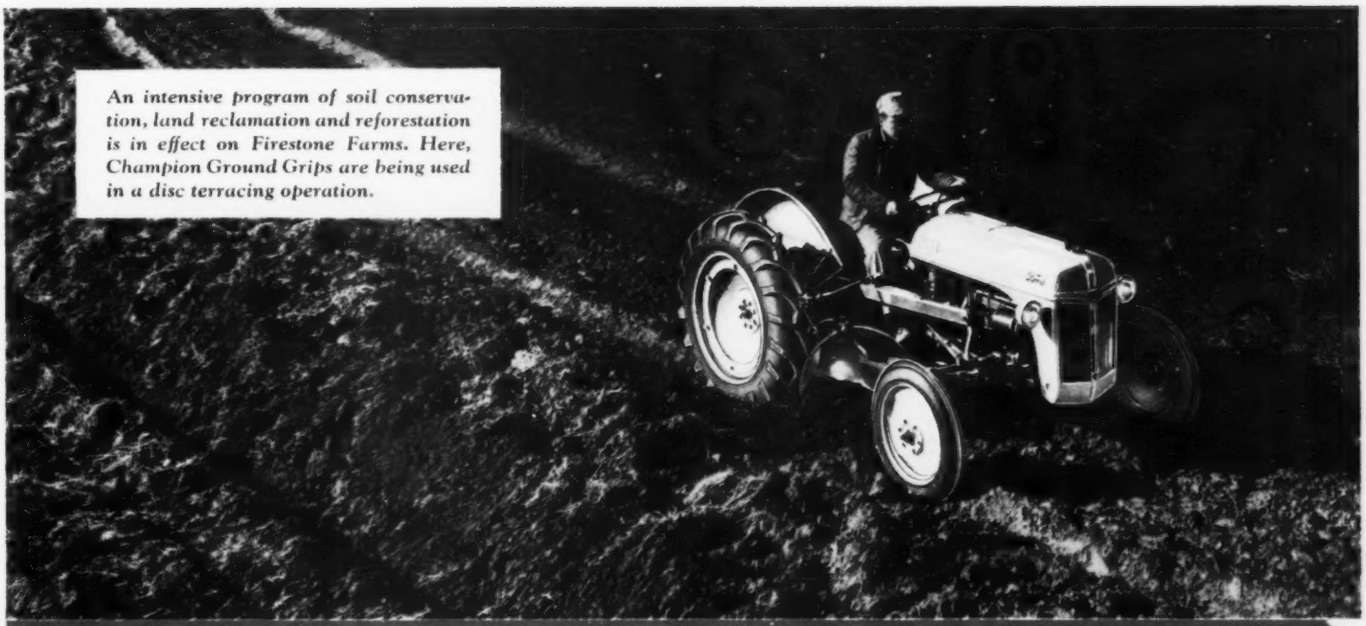
Drop in on your Ford Dealer to size-up the new engines . . . new cabs . . . new BIG JOBS . . . over 139 new models in the biggest Ford Truck line in history!

***BONUS:** "Something given in addition to what is usual or strictly due."—Webster's Dictionary*

**FORD 1948 *Bonus* Built* TRUCKS 1958**

***BUILT STRONGER TO LAST LONGER***

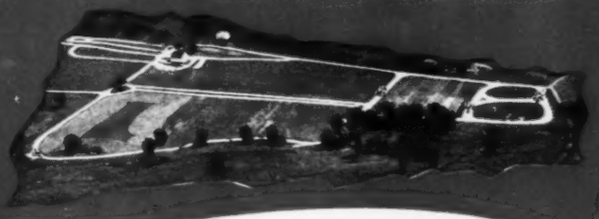
LIFE INSURANCE EXPERTS PROVE AND CERTIFY . . . FORD TRUCKS LAST UP TO 19.6% LONGER!



*An intensive program of soil conservation, land reclamation and reforestation is in effect on Firestone Farms. Here, Champion Ground Grips are being used in a disc terracing operation.*

## The Birthplace of the FIRST Farm Tractor Tire Is Today's Greatest Farm Tire Proving Ground—

# Firestone FARMS



*One corner of Firestone Farms where tractor tires are tested. All types of roads are used to determine wearing qualities.*

EVER since the day Harvey S. Firestone tested and proved the first practical pneumatic tractor tire on his own tractor in his own fields, Firestone Farms have been the first and foremost proving grounds for farm tires.

The Firestone Champion Ground Grip is a product of all these years of experience and testing. It has been tested and proved against tires of every type, every tread design.

In every test, the Champion Ground Grip has proved its superiority . . . proved it by as much as 100% more effective cleaning, 62% more drawbar pull and 91% longer life.

Because the Firestone Champion Ground Grip has been tested and proved on Firestone Farms, it will do a better job on your farm.

When you buy a new tractor or replace the tires on your present tractor, get the tire that has been proved on the farm . . . the Firestone Champion Ground Grip.

*Listen to the Voice of Firestone every Monday evening over NBC*

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## On Any Farm Job . . .

# Firestone CHAMPIONS

OUTCLEAN, OUTPULL, OUTLAST ANY OTHER TRACTOR TIRE

# Money-Making Milking is what we have to Sell!

The stimulating, milk getting tug and pull of the Surge holds the teat-cups down where they belong and protects the udders of those good cows that write your milk checks. The Surge is first of all a *safe* milker.

And there's a lot of time saving, money making speed built into the Surge Milker ... saved time that you don't have to use up washing long tubes and claws, because the Surge doesn't have any.

If you just want a milking machine you can find one most anywhere... if what you are after is Money Making Milking in your barn, then the Surge Service Dealer is the right man to see.

**BABSON BROS. CO., 2843 W. 19th St., Chicago, Ill.**

SYRACUSE • MINNEAPOLIS • KANSAS CITY • HOUSTON • LOS ANGELES • SEATTLE • TORONTO • ATLANTA

Copyright 1948 by Babson Bros. Co.

# Coming In Summer

ABOUT the time you'll finish up your corn planting the Summer issue of FARM QUARTERLY will be coming your way. Picked from the line-up of *Soil, Crops, Stock* and *Features* we would like to tell you a little about some of the articles that our contributors and editors have been spending their time in assembling, checking and illustrating.

Dr George D. Scarseth, Director of the American Farm Research Association, is a busy man, but before he shoved off for his yearly trip to Central America to tell them how to fertilize to grow bigger and better bananas he burned some midnight oil to bring the latest information on fertilizer use to grow that extra (and profitable) 10 bushels of corn. In his article "Soil Bank Balance" he probes into the future, too, and gives some startling ideas on the way we'll use fertilizer in five years from now. Ralph McGinnis, our Editor, tramped through the pastures in four Southern states in the middle of the winter to find out for himself how the cotton farmers are shifting to livestock and with good soil management and small grains and grasses developing all-winter grazing. There are ideas here that may help all of us add a month to our pasture season. Fred Knoop, our Executive Editor, wanted to know if the airplane was here to stay—on the farm. So he went out to the flying farmer state of Kansas to talk to farmers, to those that owned planes, and those that didn't, to find out if the plane is really a help in farming. If you have wondered what it costs to buy and fly a safe, fast plane and whether a plane is really practical on a farm you'll find the answers in this analytical article. Grant Cannon, who did the colorful story on the Mormon farmer in our Autumn 1947 issue, and our new Managing Editor, has found out that all Long Island ducks don't come from Long Island. He's visited duck farms all over the country and found out that this fast-growing fowl has possibilities for specialty farmers. Colorful photographs and helpful information on another kind of fowl specialty, pheasants, will highlight the article on the meat and game varieties of this unusual bird. They are as easy to raise as chickens and bring twice as much a pound on the market.

To lay the ghost of a lot of vague ideas about milk testing we have asked a milk tester with many years experience how the job is done and what it means to the dairyman. Incidentally, the author of the story is a woman who stands at the top of her profession. Dehorning of cattle and goats has always been a gory job on the farm, but a very profitable and necessary one. New methods that make dehorning painless and easy will be described in a step-by-step picture story.

The Summer FARM QUARTERLY will have the usual fine array of features. Many readers have come to regard the isolated farming group article as the most attractive feature in each issue. The color and romance of Navajo Indian farming will probably be the choice for the Summer issue. George Laycock will do one of his fine, factual pieces on the roadside stand. He believes he has the answer on how to manage a stand for profit. Then there's the problem of rats on the farm. How many rats have you, how much does it cost you every year to support brother rat, and how to liquidate him is the subject of an article that we know will attract a lot of attention. "Wildlife on the Farm" will appeal both to sportsmen and to the conservation-minded farmer. In the nostalgia department will be two features which you will enjoy immensely, the story of the now-extinct livery stable, and Little Windy and Prince Albert, who lived at the stable. And a story on the threshing ring and threshers that will bring back memories to old-timers who followed the snorting steam outfits around the county in the good old days.


**THE FARM QUARTERLY**
**22 East 12th St., Cincinnati 10, Ohio**

**R. J. McGinnis**.....**Editor**
**Fred Knoop**.....**Executive Editor**
**Grant Cannon**.....**Managing Editor**
**George Laycock**.....**Associate Editor**
**Joe Monroe**.....**Staff Photographer**
**Mary Berluti**.....**Editorial Secretary**
**Wm. D. Zaeh**.....**Production Manager**
**Aron M. Mathieu**.....**Business Manager**

# Contents


## THE FARM QUARTERLY

Spring 1948 Vol. 3 No. 1



| | Page |
|---|---|
| **STOCK** | |
| The Points of a Hog | 34 |
| The Polled Blacks | 54 |
| Fistulas Are Dynamite | 58 |
| Horses on the Farm | 74 |
| **SOIL** | |
| Give It Air | 60 |
| The Rotary Tiller | 72 |
| **CROPS** | |
| Soybeans and the Soil | 26 |
| Desert Corn | 38 |
| Blueberries | 78 |
| White Corn | 88 |
| **FEATURES** | |
| The French Earth | 14 |
| The Bill for Horace's Bull | 32 |
| Fish on the Farm | 40 |
| Pushbutton Farm | 46 |
| Spring on the Farm | 66 |
| Crows | 84 |



*Contributing Editors:* **Ray Dunn, Ralph Kenney, Robert Graham, Dave Roberts, Charles A. Reese, Banner Bill Morgan, George D. Scarseth, Myron S. Hazen, B. J. Killham, J. W. Schwab, Charles Krutch, Virgil Overholt, Katharine A. Smith, B. G. DeWeese, G. W. Salisbury, J. E. McClintock.**



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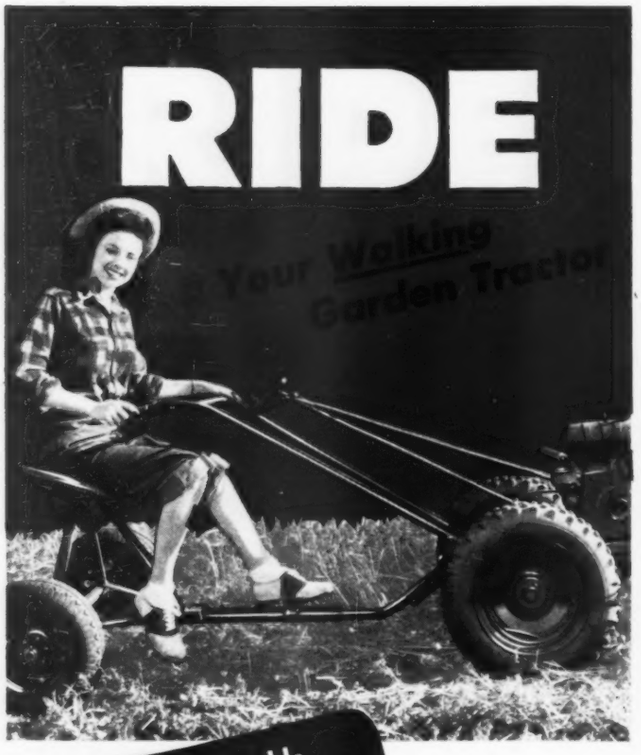
# RIDE

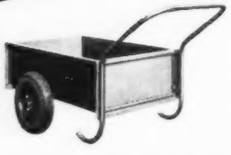



**Get a Comfortable Riding Sulky**

DON'T WALK when you can ride! This new Dandy Boy Riding Sulky takes you off your feet — puts you in a comfortable seat over two cushiony rubber-tired wheels. Wherever your tractor goes, you ride in comfort . . . in style. Controls within easy reach. Friction brakes. Be one of the first to enjoy this new Dandy Boy Riding Sulky!

Get one of the New Dandy Boy Dump Carts, too. Users say "it's the handiest thing on the place." Haul wood, shrubs, sod, garden tools, transplants, crates or baskets. All steel. Removable gates. Convenient seat and foot rests. See your dealer NOW!

**Enjoy This Convenient Dump Cart**



A tubular steel handle is furnished with each unit so it can also be used as a push cart.

## SPECIAL COMBINATION OFFER!

So many people want *both* the Dandy Boy Riding Sulky and Dandy Boy Dump Cart that a special combination deal is now available. You can save 30% by ordering Deal No. 125, because you need only *one* set of wheels for both outfits. It takes only a few minutes to switch from the sulky seat to the dump cart and back again. Whether you want the riding sulky, the dump cart, or both — see your garden tractor dealer NOW. He can give you immediate delivery. Put these easy-riding attachments to use in your yard and garden. Save time. Save work. Get extra pleasure—and extra use out of your garden tractor! Complete literature on request.

**See your Garden Tractor Dealer or Write Direct to Dept. FQ-4-48**

THE **MIDLAND** CO.
SOUTH MILWAUKEE, WISCONSIN

# LETTERS

**SUNDAY WORK**

Sir:

In your Autumn issue Carroll J. Weller complained that tenant farmers weren't willing to work on Sunday even if crops were late in being planted.

I am a farmer's daughter. My father owned and operated a farm in northern Ohio for forty years. He never once took a team of horses or a tractor out in the field on Sunday. Neither did other farmers near us.

I feel that Mr. Weller is wrong. According to the Bible, Sunday should be kept for worship and rest. Too many of us are forgetting that.

As for Mr. Weller saying that the tenant would not work on Sunday even if he knew it was going to rain on Monday, pray tell how does anyone ever know on Sunday that it will rain on Monday.

Your magazine tops any farm magazine I have ever read.

Mrs. Edwin Gehres
1217 Lake Ave.
Wilmette, Illinois

**TENANT FARMER & SUNDAY WORK**

Sir:

Farm folk, in general, are easy to get along with, although they don't like to be pushed around. I would like to say that any farmer who expects his tenant or hired man to work on Sunday, other than the daily chores that are necessary, is not deserving of an employee. Let Mr. Weller go to any bookstore and obtain for himself a copy of a book entitled, "The Holy Bible"; then if he would turn to the Book of Exodus, the 20th Chapter and read verses 8, 9, and 10; or for his convenience, I shall quote them, as:

"8. Remember the Sabbath Day, to keep it holy.

9. Six days shalt thou labour, and do all thy work:

10. But the seventh day is the sabbath of the Lord Thy God: in it thou shalt not do any work, thou, nor thy son, nor thy daughter, thy manservant, nor thy maidservant, nor thy cattle, nor thy stranger that is within thy gates."

Supposing it should rain on Monday, as Mr. Weller states, why worry about it. Get on the boat with Noah, and you will come out all right.

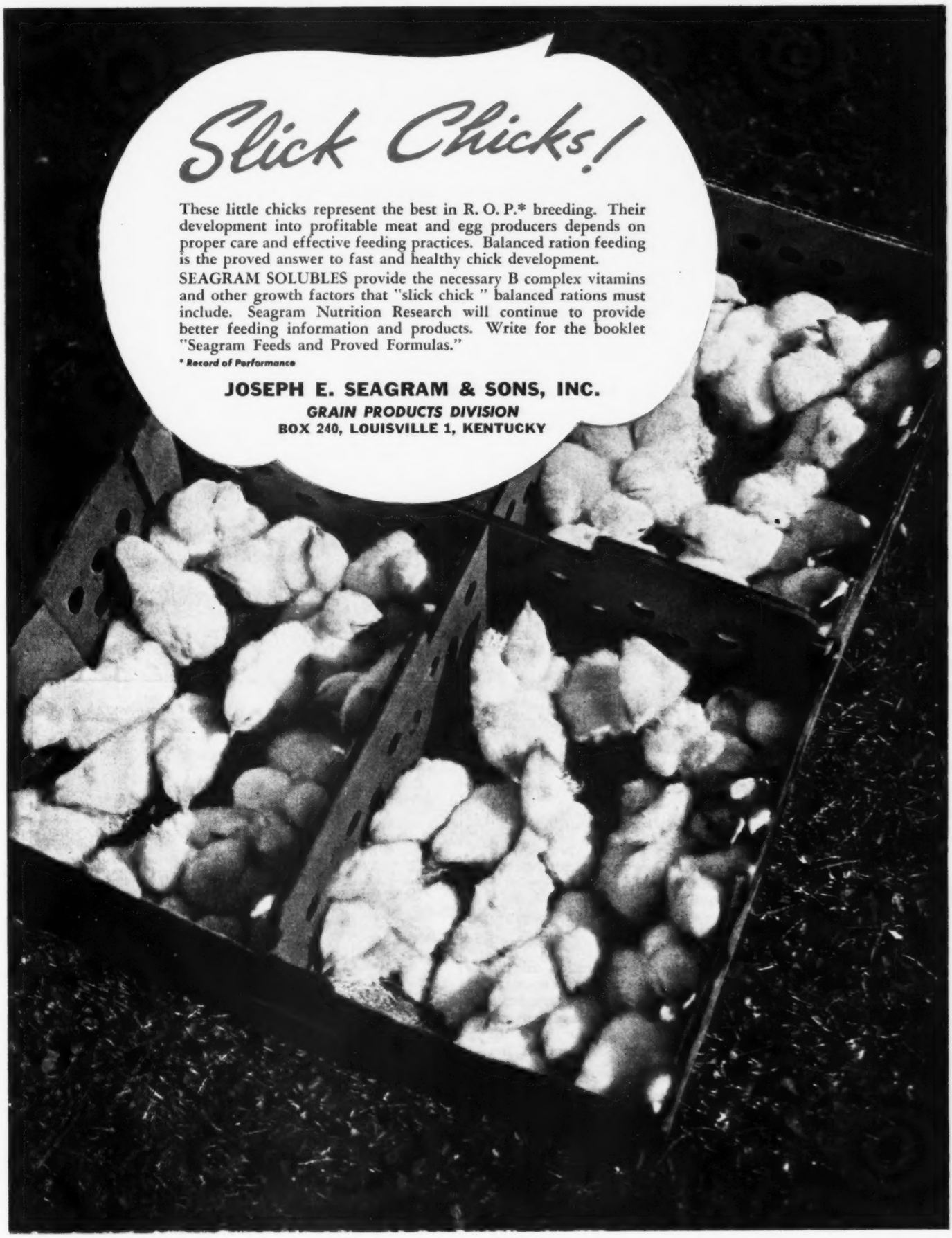
Mr. Weller claims that he has been "leaning over backwards." Now, maybe right there lies all his trouble. Instead of leaning over backwards, why not lean forward and put yourself in the tenant's place and consider his side of the picture. This might help to solve the whole program.

When a man rents a farm he has or should have full jurisdiction over the operating of the farm for the period of rental. However, a program should be set up that would meet the approval of both the owner and the tenant before the contract is signed or the farm is rented.

I am a tenant farmer and have never had any words or criticism from my employer. When any problem arises we talk it over together and come to an agreement that is agreeable to both of us.

Mr. Earl T. Cosner
10684 Liss Road, Route 3
Belleville, Michigan

**It's Sunday; you're hay is down, and the weather says "RAIN" for Sunday night and Monday. You're a tenant. Should you bring in the hay? What do readers think?—Ed.**


Slick Chicks!
These little chicks represent the best in R. O. P.* breeding. Their development into profitable meat and egg producers depends on proper care and effective feeding practices. Balanced ration feeding is the proved answer to fast and healthy chick development.
SEAGRAM SOLUBLES provide the necessary B complex vitamins and other growth factors that "slick chick" balanced rations must include. Seagram Nutrition Research will continue to provide better feeding information and products. Write for the booklet "Seagram Feeds and Proved Formulas."
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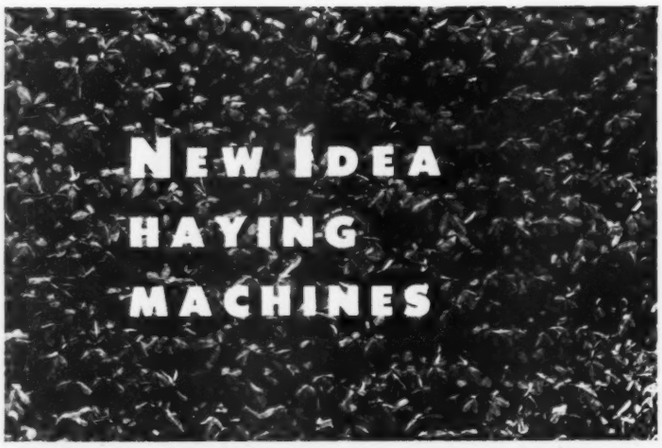
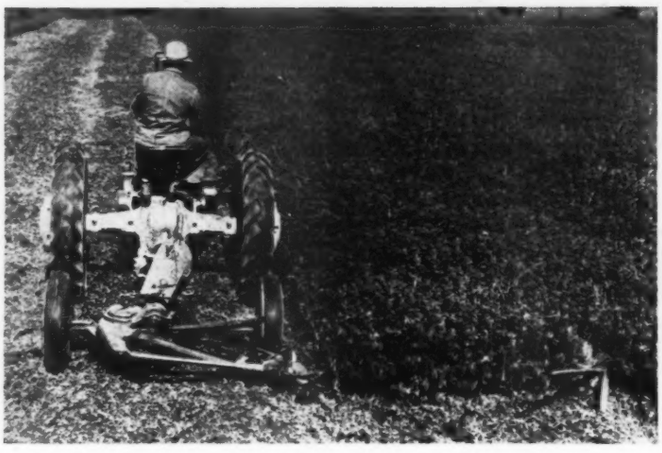


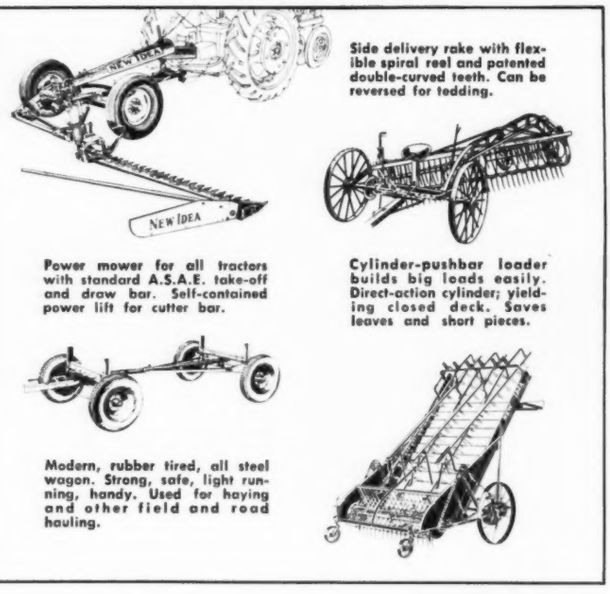


## GOOD HAY-natural Feed Stretcher and Grain Saver

You know the importance of good protein-rich hay. And this year you certainly want to put up the best hay you ever had. The reliable construction and smooth performance of NEW IDEA Haying Machines help you take advantage of every favorable break in season and weather to get the most nutritive hay possible.

The quick hitch and speedy operation of the NEW IDEA Tractor Mower starts you cutting the moment conditions are right. The NEW IDEA Side Delivery Rake builds tall, fast drying windrows in a way that protects both leaves and color. The NEW IDEA Loader picks up clean, elevates without threshing and delivers on the load without losses.

NEW IDEA machines assist you to make secure all the quality that nature puts in the hay. For detailed information, see your local dealer; or mail convenient coupon below.




Power mower for all tractors with standard A.S.A.E. take-off and draw bar. Self-contained power lift for cutter bar.

Side delivery rake with flexible spiral reel and patented double-curved teeth. Can be reversed for tedding.

Cylinder-pushbar loader builds big loads easily. Direct-action cylinder; yielding closed deck. Saves leaves and short pieces.

Modern, rubber tired, all steel wagon. Strong, safe, light running, handy. Used for haying and other field and road hauling.

# NEW IDEA

## FARM EQUIPMENT COMPANY

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**NEW IDEA Farm Equipment Co.**
**Dept. 223, Coldwater, Ohio**

Send free information on items checked.

Tractor Mower ☐ Side Delivery Rake ☐
Cylinder Pushbar Loader ☐ Wagon ☐

NAME_____

ADDRESS_____

# Curtiss Candy International Grand Champions ...fed the WAYNE WAY

## 485 LB. LITTER AT 56 DAYS...

**The peak of perfection!** These Yorkshire barrows . . . International Grand Champions in the 10-Carcass Class . . . were fed the Wayne Way from start to finish by the famous Curtiss Candy Farms of Northern Illinois. "In the Fall of 1946 we decided to give the Wayne Hog Feeding Program a one year trial," writes Delbert Kingston, Supt. of the Livestock Division of Curtiss Candy Farms. "We raise approximately 10,000 hogs each year and are feeding them according to your Wayne Hog Feeding Program."

**OTHER CURTISS CANDY HOG WINNINGS 1947 INTER-NATIONAL. First Middle-weight and Champion Barrow**
**First Pen of Middle-weights and Reserve Champion Pen**
**First Pen of Heavy-weights and Reserve Champion**
**First Pen of Light-weight Barrows**
**First and Fourth light-weight Barrow**
**Second, Third and Fifth Heavy-weights**

. . . that's the record of this Curtiss Candy Yorkshire sow who farrowed 17 pigs and weaned 15! "We start feeding our 75 Yorkshire sows Wayne Sow and Pig Meal and farm grains just before breeding them," writes Delbert Kingston. "We feed this ration through gestation and nursing periods. At birth pigs weigh from 3 to 3½ lbs., and average 40 lbs. at weaning. The 75 sows averaged 8.7 pigs per litter weaned." (National average, 6.1 pigs per litter weaned). "After weaning, we feed our pigs Wayne Hog Supplement with farm grains till marketing. They average 240 lbs. in six months!"

Curtiss Candy Farms' outstanding success is a tribute to excellent breeding, feeding and management. You, too, can get outstanding results the Wayne Way. See your Wayne Dealer today for full details or send coupon below.

**FREE!**

**Allied Mills, Inc., Ft. Wayne 1, Ind.**

Send free feeding information on

Chickens ☐ Turkeys ☐ Calves ☐
Hogs ☐ Dairy Cows ☐ Feed Cattle ☐

Name _____

Address _____

**Back of every successful livestock enterprise is a sound feeding program**

**WAYNE FEEDS**

WAYNE POULTRY AND LIVESTOCK FEEDS

PREVENT THIS

...use modern treated lumber

DECAY
TERMITE
Protected
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PENTACHLOROPHENOL

Take a careful look at that picture. Is this wood failure occurring in your home, barn, toolsheds, or in the fence posts surrounding your property? Such destruction—whether due to decay or termites—can now be prevented simply and economically with oil solutions of Pentachlorophenol—the modern wood preservative. It provides lasting, tested protection against rot and wood-destroying insects. Pentachlorophenol leaves wood clean and non-sticky, and paintable if the proper solvent is used.

Ask your lumber dealer about Pentachlorophenol treated lumber before you build or repair—or write direct to Dow.

SEE HOW YOU CAN CUT BUILDING REPAIRS! *Write today for this free booklet telling all about this tested, modern wood treatment. Ask for booklet Number PE-37.*

DOW

CHEMICALS INDISPENSABLE TO INDUSTRY AND AGRICULTURE

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN


**REBUILDING SOIL**

Sirs:

I have inherited a 250-acre farm which is in need of rebuilding. What books could you recommend for my reading which could give me a general picture of soils and the means of restoring them.

FRANK TATUM
North Vernon, Indiana

Prof. John A. Slipher at Ohio State University, who has taught a lot of boys to be good farmers, gives the following list of books as a short refresher course on soils, physics of agriculture, and fertilizers:

Baver—"*Soil Physics*" (Wiley).
Mosier & Gustafson—"*Soil Physics and Management*" (Lippincott).
Van Slyke—"*Fertilizers and Crops*" (Orange Judd).
W. W. Weir—"*Productive Soils*"

The first of these books is up-to-date and is more technical than the second. The second is about 30 years old. However, it is very readable and very sound. Van Slyke's text is quite comprehensive and a good guide for the man out on the land. It gives much material on the composition of soil, the compounding of fertilizer, soil analysis and cropping situations. Weir's book came out just last year and is very informative.

**CHINCHILLAS**

Sir:

We would like very much to have you do an article about the newest phase of fur farming, namely, the raising of Chinchillas. Since this industry started on the West Coast, we have discovered, upon coming back here from the Coast that not too much is known in the Middle West about the Chinchillas. Practically everyone confusing them with the Chinchilla Rabbit. Like everything else, there has a lot of misinformation gotten around which has done the Chinchilla rank injustice. As Chinchilla Breeders, we would like to see this corrected; which I am sure one of your well written and informative articles could do. Meanwhile, for reliable information may we direct your readers to Mr. Joseph Holland, Secretary of The National Chinchilla Breeders Association, 425 Atlas Bldg., Salt Lake City, Utah, or Mr. Lloyd Prestwich, owner of Fur Farms, Box 217, Gardena, California.

The fine article on Rabbits, Karakul Sheep and The Brahmans have prompted me to give you this suggestion.

MRS. J. H. ETTER
Washington, Illinois

**BRAHMANS**

Sir:

I have read the interesting article, on your Summer Issue, by Mrs. C. Faye Bennett "THE BRAHMANS."

As he mentioned Guatemala as one of the South American Countries where we raise Zebu Cattle, I opportunely give you my experiences about it.

I have "fought" for five long years with Zebus, I endured that long. Finally I had to give it up, and now I hate anything with a hump.

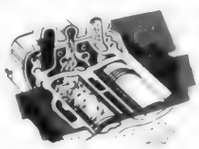
Zebu Cattle has all the good qualities that Mrs. C. Faye Bennett tells us, but personally I should like to let the Hindus struggle along 6,000 years more with them, until a breeding cow learns to discriminate man from wolf, until Zebus learn to get out of the Corral from the gate, that a fence is there to keep them away from anything edible that happens to be on the other side, to be less gregarious so when they are cut from the main herd, to stay cut, until, when driven along the highway, they learn to behave like cattle not like deers.

But in my younger years I might have been an excitable Devil myself. Now I am getting grey, but I learned that TAME cattle pays better.

C. BRESSANI
Cocales Guatemala

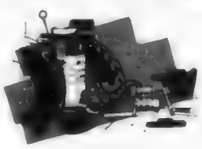
Until you drive one, you'll never know how much more a new John Deere "A" or "B" Tractor offers you in performance . . . in ease of handling . . . in comfort. No other tractor has so many modern features. Here are just a few of them.

### NEW CYCLONIC-FUEL-INTAKE ENGINES



New *cyclonic* action mixes fuel and air more thoroughly, improves combustion, increases engine efficiency. Both all-fuel and gasoline engines available.

### NEW HYDRAULIC POWR-TROL



You raise, lower, and regulate *both* integral and drawn equipment at a touch of your hand, without stopping or even slowing down.

### NEW ROLL-O-MATIC FRONT WHEELS

Weight is automatically equalized on *both* front wheels to give you "knee action" comfort and easier steering than ever before.

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You drive in and hook up a John Deere Tractor Cultivator in a matter of minutes—make real savings in change-over time.

And, until you actually own a John Deere, you'll never appreciate what *exclusive two-cylinder* design with its unequalled simplicity and strength of parts can mean to you in *lower* upkeep costs . . . *more* years of service . . . *greater* freedom from costly field delays.

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This new folder tells all about the great new John Deere "A" and "B" Tractors and why they are today's outstanding values. Write to John Deere, Moline, Illinois, Dept. 058, for your free copy. Do it

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*First* IN MODERN DESIGN
AND PROVED PERFORMANCE

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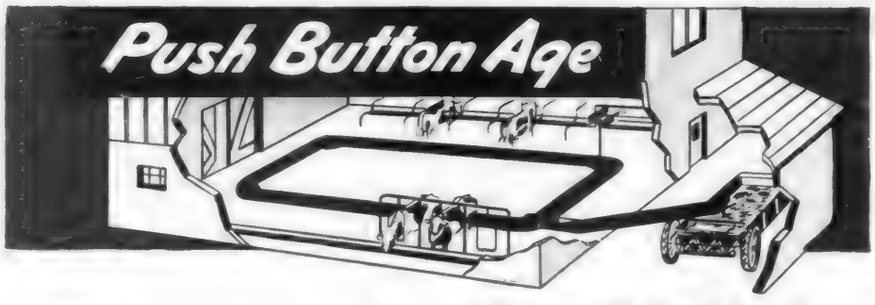
- Herefords from Iowa feed-lots have topped the market more times than any other State
- 500 Purebred Hereford Breeders Welcome You to Iowa to buy Breeding cattle—Herd bulls—Foundation females

NO ORDER TOO SMALL — NONE TOO LARGE
IT PAYS TO BUY THE TOPS AND IOWA HEREFORDS ARE TOPS
*INQUIRIES PROMPTLY ANSWERED*

## IOWA HEREFORD ASSOCIATION

J. C. HOLBERT, Sec'y BOX 492 WASHINGTON, IOWA






## comes to the FARM!

The CROWN PUSH-BUTTON BARN CLEANER cuts farm labor costs! Here's an investment that saves you at least 2 hours every day—*extra productive* hours that mean *extra* profits.

COSTS BUT A FEW CENTS A DAY! You just can't hire a man to do barn cleaning chores as quickly, thoroughly, and economically as your *automatic* Crown Barn Cleaner. Push the button and forget your barn chores—in a matter of minutes *all* manure, including nutritive liquids, is loaded directly into your spreader.

SAVE PRODUCTIVE TIME—SAVE MONEY! See your Crown Dealer or write for free illustrated booklet today!

CROWN *Push Button Equipment* FOR BETTER FARMING
MARATHON
FOUNDRY and MACHINE COMPANY
WAUSAU, WISCONSIN

**IT HAPPENED HERE**

Sir:

A well-to-do neighbor and I during the war and a year afterwards had trouble trying to keep up a dilapidated line fence. He raised thorobred jerseys along with Belgian draft horses. My neighbor, although he had 400 acres to play with, would put his draft horses and unbred heifers in this one particular field where the grass was short on both sides of the dilapidated line fence. Now on my side I had one big open pasture of about 100 acres and in it were 50 not too contented thorobred angus cows and one pert, but overworked, angus bull. Naturally, the grass is always greener on the other side of the fence. So my bull visited. On the other hand, he was pretty busy on my side of the fence so the anguished jersey heifers visited also. The net result in three years time there has been 8 robust black calves, some with small horns, born to my now richer neighbor. Don't you think I have a good strong bull?

My neighbor claims $8000.00 as damages to his herd. He doesn't offer to reimburse me for breeding fees. Our trial comes up January 28 and if I feel O.K. after that, I will write you the outcome.

CORWIN FRED
Lebanon, Ohio

**For slightly ambiguous photograph of another traveling bull, see page 33.—Ed.**

**REED CANARY GRASS**

Sir:

I enjoyed "The Promised Land" very much. Our Minnesota experimental men gave up Ladino too easily—our results were very spotty, but with the help of your article I may get better stands. The feeding quality is excellent.

I have had poor results with reed canary grass as milk producing hay and would not recommend it to anyone, but am perhaps one of the few people to have used it extensively as grass silage where it produced, reason unknown, as much milk as a legume silage. As this grass forms permanent sod, stands in ice all winter, and with almost no care produces about 6 tons per acre of silage on July 1st, plus one-half ton or better of hay of good quality on September 1st (Minnesota), it would seem perhaps it could be used in Alaska, at least for a silage crop. While I use it on peat too cold and wet for corn, canary grass will also grow on uplands.

Alaskan farmers may try it as a grass silage.

G. N. SLADE
Rt. 9, White Bear Lake, Minn.

**MORE DEER PARKS**

Sirs:

Since the publication of my article in Farm Quarterly, I have had numerous requests to sell live deer but I have not attempted to catch any deer in some time. I have sold six deer "hog dressed" (entrails only removed) to a New York meat dealer for 65c a pound. Since this means $65.00 to $70.00 for stags, and $45 to $50 for does, and since shooting a deer is easier than catching one alive, I haven't given much thought to the latter.

Recently, Sika deer have been quoted at $50.00 to $70.00 each, alive, in trios. Sources:

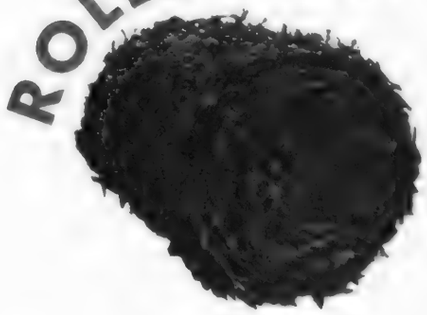
Roland Lindemann, Catskill, N. Y.
H. Ehmler, Hoosick Falls, N. Y.
Swope Park Zoo, Kansas City, Mo
Smith's Game Farm, Mansfield, S. D.
City of Boston Zool. Park. Boston, Mass
W. S. Green, Greenwood, Va.
Paul Spencer, Gentry, Mo.

These people handle breeding stock regularly, and are equipped to catch and ship Sika deer. One of your readers, John P. Kennedy of Waterville, Maine, constructed a six-acre park, purchased and released a trio of Sika deer, and been written up twice in the Augusta and Portland papers. We answered many letters. . . .

PHILLIP J. SAVAGE, JR.
Royal Oak, Michigan

(Continued on page 113)

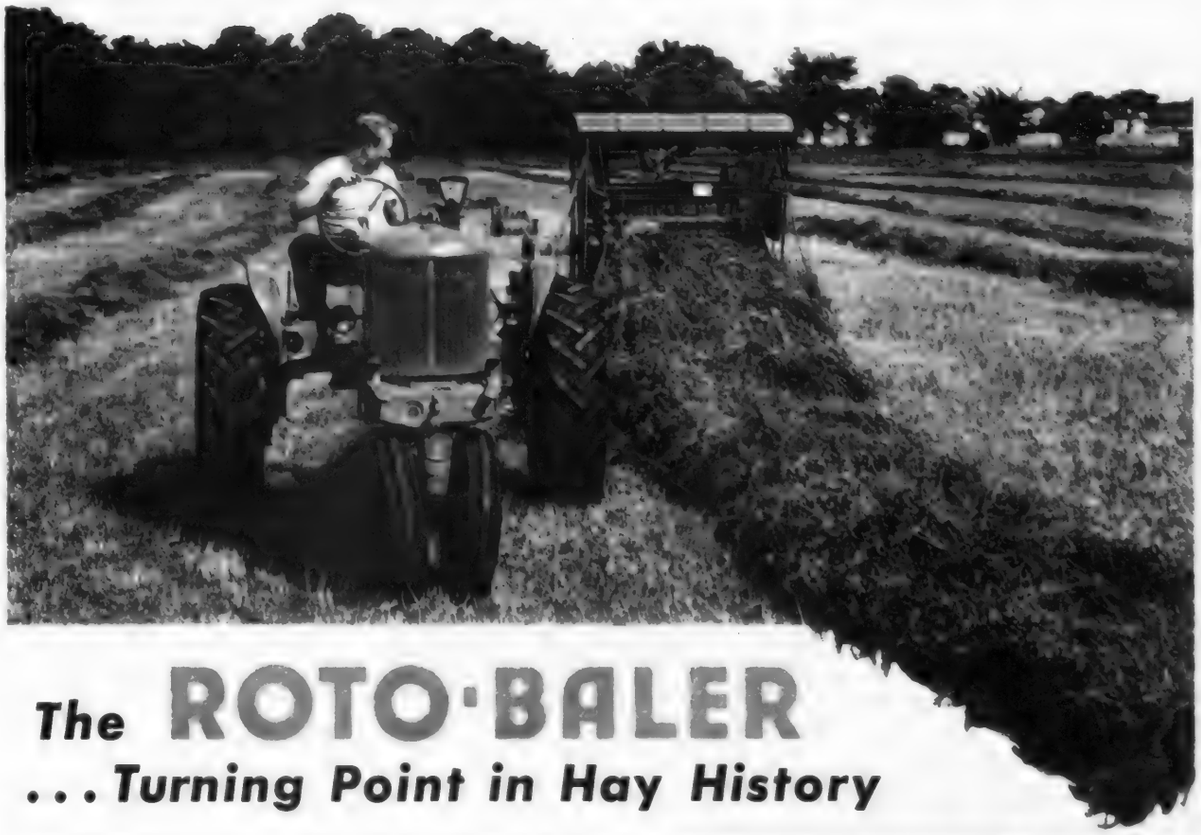
# ROLLED HAY.... *The Bale of the Future*



A weather-resistant *rolled* bale with leaves locked inside! That is rolled hay . . . a bale that for the first time sheds rain like a thatched roof. Once your hay is in the rolled bale, you breathe easy. It's safe from sudden showers. The bale unrolls in a wide, soft, leafy mat, appetizing to livestock; can also be fed whole in the feedrack without waste.

The rolled bale represents a turning-point in haymaking for every family farm. Now you can package your *own* hay—with a home-owned one-man field baler, priced to fit the individual farm.

If hay could be trademarked, Allis-Chalmers would proudly place its name on the *Rolled* Bale.



## The ROTO·BALER
## . . . *Turning Point in Hay History*

When blossoms say "ready" and the weather is right, that's when a home-owned Roto-Baler pays off. Hay or straw is automatically wrapped with ordinary binder twine costing less than wire or heavy bale twine.

The Roto-Baler packages hay more compactly . . . in sturdy rolled bales that will not buckle . . . bales that store in less space and are convenient to handle and feed. Thousands of farmers from coast to coast are already making hay this better way . . . and like it.

**ROTO-RAKE** . . . the first side-delivery rake and tedder really engineered for tractor power. Power take-off driven, it has 2 forward reel speeds and 1 reverse (for tedding). Ball and roller bearings exclusively. Controlled steering assures straight windrows.

**ALLIS·CHALMERS**
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THE FRENCH FARMER learned to make a fort out of his buildings during the Middle Ages when robber barons sent marauding bands to ravish the lands of his neighbors. Chaussy Raymond's farm presents a solid stone face to the outside world. Behind the seclusion of these walls he lives in intimate privacy with his family and his animals. At night his head lies easy on his rough pillow for he knows his horses and cattle are snug in the stables close by, his grain and machinery safe against the world. He continues to close the gates at night; the robber barons are no more but twice in his lifetime he has barred the gates against an invader.

THERE IS A CLOSE AFFINITY between the French peasant farmer and his manure pile and the soil. The combination has maintained the fertility of fields farmed continuously for more than a thousand years.

# The French Earth

BY R. J. McGINNIS

THIS is the story of Chaussy Raymond and John Huguet, two farmers, who live in the Department of Seine & Marne, in central France. Except four years which Raymond spent in a German prison camp, he has lived all of his 53 years in the house where he was born, the solid stone house of his fathers. Huguet is his neighbor, and a younger man; he too has his roots deep in the farm which generations of his family have worked. Although Raymond and Huguet attend the same church and help each other in the harvest, they tackle their farm in different ways. There are many more Raymonds in France than Huguets; Raymond is a peasant farmer; Huguet is on the dividing line between the peasant and the gentry. He has an automobile and an electric icebox and buys purebred breeding stock. They are both expert farmers.

### Chaussy Raymond

On this late autumn day of 1947, of all men in the Department of Seine & Marne, Chaussy Raymond was undoubtedly the happiest. A year and a half before he had hopefully entered his name with the Agricultural Control of the Department for a new tractor. This morning, after delivering a dozen eggs and a brace of rabbits to the innkeeper at the Cheval Blanc, he stopped at the Mairie, as he always did when he was in the village, to ask about his tractor. "Le Bon Dieu has answered my prayers," shouted Chaussy. The tractor had arrived. He signed his name to papers in quadruplicate, shook hands with the mayor, and made a beeline back to the Cheval Blanc. Here he stood his friends to a bottle of good red wine. Now, warmed by the glow of the wine, and elated that in a few weeks a bright new American tractor would be his, he urged his 20-year-old mare, Cecile, homeward, singing snatches of Madelon, the marching song of the poilu. The ownership of a tractor made him a man of substance and importance in his community, for in all of France only one farmer in forty owns this prize of all farm implements. Besides that, he could grow more beets and potatoes and perhaps he wouldn't have to work far into the night, with his aging horses and oxen, to get his harvesting and planting done. It is true that it was not a gasoline tractor, such as he had hoped to get. It would use fuel oil and would make a lot of noise, emitting showers of sparks and clouds of smoke; but it was a prize nonetheless.

It was late when he mounted the hill to the dark cluster of barns and farmhouses. His mare from long habit chose the turns in the medieval maze of passageways to his own barn. From the courtyard the satisfying odor of the steaming manure pile tickled Chaussy's nostrils and gave him a sense of well-being and hope for the coming winter. His dog barked from his kennel under the rabbit hutches and the pig grunted a sleepy welcome. He was too late to help with the chores. Dinner was on the table.

### Background of a French Peasant

Chaussy, now 53 years old, was born in the farmhouse where he lives. He is

**THE FRENCH FARMER wants tractors and modern machinery, but he will be slow to part with his oxen, for they are the chief source of the manure he values so highly. The gateway and the stables on this farm were built 500 years ago.**

short and squat, with broad hands, and he habitually wears a cap. He married a neighbor girl just before he was called up in the second class in World War I. He had returned to his farm after the war and until the second World War broke out he had accumulated some government bonds, had a respectable horde of gold pieces under a floor board in his bedroom, and owned one share of Canadian-Pacific Railway stock.

When War No. II came he was just within the age for military service and was sent to the Maginot Line to face the Germans. In the break through at Sedan he was taken prisoner and spent four hungry and cold years in a German prison camp. At the Liberation he went back to his farm.

All but one of his five horses were requisitioned by either the German or the French army; his wife was aged and stooped beyond his remembrance and his daughter no longer young and pretty. His heart burst when he saw his fields and his barns. His soil was ill from lack of fertilizer and manure.

Chaussy's land holdings total 60 acres. Like many of his neighbors, he does not hold his farm in one piece. It is scattered about the countryside in 25 parcels, one more than a mile away. His wife brought to him as a dowry eight of the parcels. Of the remainder he had received six from his father and purchased the others from his sister. By French law each child, male and female, inherits an equal amount of the property held by the parents. This Napoleonic law was designed to prevent the accumulation of large holdings, resulting in the sub-division of the already small French farms. Unless a man is thrifty and lays by enough money to buy out his sisters or his brothers, (in the rare

←

**GLEANING after the harvest is an age-old custom in France. These landless peasants have gone over the fields and will get half of the sacks of beets they have found. In America they would be on the relief rolls. The distant tree-bordered highway and the level fields are typical of the wheat and beet regions of France.**

DETROIT PUBLIC LIBRARY

THE GENDARMES, casual but sharpeyed, pay regular calls on French farms to chat, drink a glass of wine—and to check on the wheat bins to see that none has been fed to the animals or gone to the black market. The 1947 crop all went to the baker.

event they are willing to sell) he does his farming on small scattered plots which probably will be sub-divided again among his children. The largest of Chaussy's plots is one hectare, about two acres. The smallest is less than one-tenth of an acre. a few rods away from his farmyard wall, and is used for a kitchen garden.

### Chaussy's Husbandry

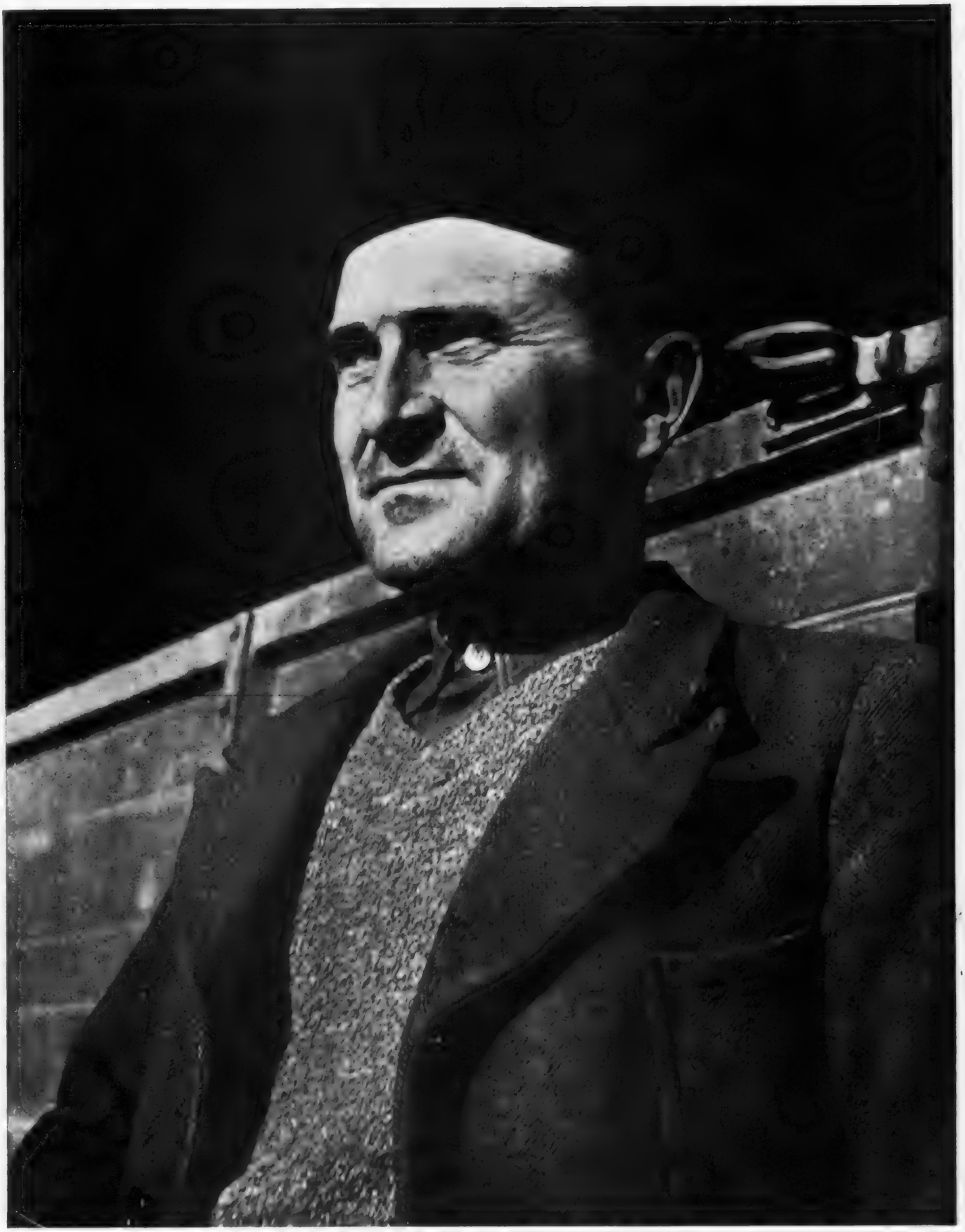
The day before Chaussy received the good news of his tractor he had finished planting wheat. In the matter of seed he profited by his foresight and thrift. The wheat crop harvested last summer had been damaged by winter freezes and further damaged by an extensive drought, so that it was only a half crop, and that not of good quality. But the summer before it had been excellent, and Chaussy had stored away in a secret bin over his kitchen a little margin of safety. This he has used as seed. Though it was a year old and would not germinate as well as new wheat he had planted more of it and hoped for a good crop.

When he had made his fertilizer needs known to the Agricultural Control he had not expected to get his full requests, but he was disappointed when he got a cut of more than half of what he had asked for. He paid somewhat higher prices than farmers pay in America. As for manure he had the usual amount from his three horses, four cows, a bull calf, two oxen and a small flock of sheep. On the thinner portions of several strips he had hauled out his chicken and rabbit manure, and in other places he pieced out with some old straw.

Last fall Chaussy planted twenty acres of wheat after taking a beet crop from the same fields. He had about twelve acres of luzerne, our old American friend, alfalfa, which he had planted with an oat crop the year before. This he would use in its second year for forage for his cattle, horses, and sheep. Next spring he would plow up the twelve acres of luzerne and plant beets. Roughly, he practices a four-year rotation of beets, wheat or oats, and luzerne two years. During the war his fields had been farmed heavily and some of them need rest. He plans to give them a heavy diet of manure, perhaps allow some of them to remain three years in luzerne. He might take some of his beet land next year for potatoes, now that he has a tractor, and he might also plant barley instead of oats. On the second-year luzerne he will pasture his cows for a time in the late fall if the grass does well enough after the hay is cut. Otherwise, he will keep them in the barns and feed them the cured hay.

Chaussy has four cows, a half grown bull calf, and a pair of white oxen, great lumbering beasts that make plenty of manure. Two of his cows are of a Netherland breed very much like Milking Shorthorns. The larger weighs 1800 pounds. The two others, also dual-purpose cows, are white animals commonly called Normands. They produce a fair amount of milk; their chief recommendation is their ability to produce manure and the beef value of the bull calves.

The American farmer might find it difficult to understand the kinship which exists between the French peasant farmer and his soil and animals. The French peasant's bone and sinew is of the earth on which he and his fathers for hundreds of years have walked, which they have worked with their hands, and from which they have taken the food that has gone into their bodies. The barns, some of them as old as the French nation itself, are peopled with the ghosts of countless generations of men and animals of the same blood. The oaken stalls, worn smooth by processions of cattle and horses stretching back to the Middle Ages and beyond, seem as permanent as the French hills themselves. A French peasant does not have to learn his fields; he is born with them in his blood. As he goes about, feeding and bedding his animals, he and the barns and the animals all seem a part of one whole. He is born a farmer and is not likely to have the ambition to own a



HANDSOME JOHN HUGUET wears English tweeds with ease. He buys Manitoba seed wheat and purebred animals from Holland and England. His 160 acres grossed him $9,000 last year, low because of the drought. He instinctively practices good soil management and has a shrewd understanding of markets and buying. He could take first rank in any progressive farming community in the United States.

**It is quitting time for Chaussy Raymond, seven o'clock on this late October day. With his son-in-law he has finished planting a hectare of wheat. He has walked beside the old-fashioned spike tooth harrow all day, preparing the seedbed for the drill. Last week he had taken a beet crop from the same ground and the earth was friable and needed no plowing, for the beet digger had gone deep and worked it up well. His big Percheron mare, Cecile, had pulled the harrow back and forth across the strip and the seedbed was fine and deep. His son-in-law followed with the drill, walking beside his team. Although the beets had been carefully gathered, this day the harrow turned up broken pieces of the brittle roots which had been broken off in the pulling. As these came to the top of the ground Chaussy picked them up and stuffed them into his pockets. At the end of each round he emptied his pockets, making small, neat piles at the edge of the field. Now, at the end of the day, he is gathering them. He will throw them in his cart and some rainy day soon will take them to the mill at Chateau Landon where he will get a few cents for them, enough to buy a pack of cigarettes or a pound of sugar. Chaussy is tired and has worked up a fine appetite; Cecile is tired too, and there's a slow mile to the farmhouse and the dinner, but Chaussy would not think of leaving the beets. There was a time within his memory when his profits were represented by just such small thrifts as gleaning the beet roots from a field and the sou he gained by close bargaining. Now that prices for his crops are high he does not forego a habit that has become second nature to him. He may own town property or a fat sheaf of gilt-edged bonds, but the beet root and the ear of wheat fallen from the reaper are real also, and nearer to his hand and heart.**

grocery in the village, or to leave his fields for the factory.

Chaussy is not stingy with his bedding. When his wheat is cut he stacks the sheaves near his barn and in time a custom thresher comes, threshes the wheat and bales the straw at the same time. The baled straw is stacked near the barn and carried in as bedding. Every evening the cattle are bedded down in knee-deep layers of clean straw and each day this is taken out and piled in the manure pit or in the center of the courtyard outside the barn door. The animals walk over it, packing it down until the next fall, when it is placed on the beet fields.

### Manure Is Better Than Currency

If Chaussy had his way the national emblem of France would be a manure pile on a field of wheat. Manure is the basic element in French economy, and as the manure piles of the nation increase so does the value of the franc. A farmer's standing in a community is in direct proportion to the size and condition of the manure pit in his barnyard. On the rare Sunday afternoons when a Frenchman is not working he may visit his friends to compare their manure piles with his own. A year is finished when the manure has been hauled out in the late summer to the fields; a new year starts with the new pile. Marriages are arranged with a manure pile as a dowry; it is often thieved; it is guarded and cherished and its aroma sampled and admired.

If Chaussy had received his full needs of fertilizer he would have used about 450 pounds per acre of either an 8-8-8 or a 10-10-10 formula. He would have placed the potash and the phosphorus on his beets, half the nitrogen with the wheat at planting, and the remaining half the following spring as a top-dressing when the young wheat was well up. The manure he spreads on his beet fields and allows it to carry over into his wheat. Manure is hauled to the fields in a cart, unloaded and scattered by hand. There are few spreaders in France.

In a small pen between the cow stable and the kitchen door Chaussy has a half grown pig. This is for his own use and is fed on the scanty food scraps from the household and on beet pulp which he buys at the beet processing mill in Chateau Landon. This beet pulp, mixed with chaff from the threshing, is the only other feed other than hay and a limited amount of oats and barley that Chaussy is permitted to feed his stock. Wheat is under government control and gendarmes periodically inspect his grain bins to see that he is not feeding the precious grain to his animals. Right after the harvest the gendarmes begin making their regular rounds of the farms. They ride up on their bicycles, dismount and shake hands all 'round. After a decent chat on the subject of the weather and the animals and perhaps politics, they may ask to see the wheat bins. If the farmer enjoys a spotless reputation for

This is the pig that lives in the sty hard by the kitchen door of Chaussy Raymond. A relative probably of the Chester White, his outsize ears show an unbalanced diet. He rarely has enough to eat since the law forbids Chaussy to feed him wheat.

THIS IS THE START of a manure pile which will be eave-high a year from now. It has a concrete floor; as it grows the walls will be built up with bales of hay.

THIS FRENCH-MADE TRACTOR, a Diesel model of ancient vintage, is heavy, slow, and cumbersome. In its prime it could not compete with the American machines.

honesty their visit may be only a token, and nothing is said about the wheat. A few grains on the ground in the courtyard, or an over-fat pig may excite their suspicions. They are accepted as a necessary part of the burden of officialdom and they are shown the respect that all Frenchmen extend to men in uniform. They are very polite and there is generally an exchange of cigarettes and perhaps they will be offered a glass of brandy if the weather is nippy.

The lack of grain feed is reflected in the condition of the animals and fowl. Chaussy's pig is gaunt and eternally hungry. He squeals and grumbles all day, and when his hunger becomes too acute he sticks his head and shoulders out of his pen and complains to the world of the barnyard.

Chaussy's fowl, ducks, geese and chickens forage for themselves around the stack of baled hay and pick up what they can in the barnyard. Occasionally Madam Raymond defies the gendarmes and feeds them a little wheat. None of his animals are fat, but then the price of wheat is high and one can't have both fat animals and wheat in the bin. Chaussy has never seen a 400 pound hog.

### Chez Raymond

The house and barns of the Raymond family are part of a nest of buildings in which live six other families, all small farmers. The walls and buildings intersect at crazy angles, and have grown through the generations into an intricate and puzzling design that is nevertheless amazingly well adapted to the semi-communal life. All buildings are of stone, or stucco over stone, even the dog kennel and the pig sty. The group presents a blank, high wall to the outside world, doors and windows opening only on the separate courtyards.

Chaussy's house of six small rooms is set against the north side of the courtyard between the horse stable and the pig sty. There is a little parlor of sorts, a combined laundry and utility room, three bedrooms, and a kitchen, the most important of all the rooms. In it are a small wood-burning stove, a cupboard for china, and a table and chairs. Here the meals are prepared and eaten and here the family spend their waking moments indoors. There is no heat in the house except from the minute firepot in the kitchen stove. The bedrooms are bare and cheerless, used exclusively for sleeping. When Chaussy and his wife go to bed they crawl between two feather mattresses. The sheets are heavy, coarse linen which have served two generations of Raymonds. There is a little fireplace, rarely used, in the parlor, a chest, an uncomfortable horsehair sofa, and an overstuffed chair which has French lines but might have been made in Grand Rapids. On a little hand-made table is a cheap Italian music box and a photograph of Chaussy in the uniform of a chasseur. Here Chaussy's daughter was courted and

**WHEN THE ROMAN LEGIONS garrisoned France shepherds such as this guarded the village flocks on the communal pastures. Because fences and fence rows use valuable ground, this is the common way of pasturing sheep today. Permanent pastures are rare; meadows are grazed only after a hay crop has been taken off in the late summer.**

here the priest is served a glass of wine when he calls. It has a musty smell, like the unused parlors in America's Midwest.

Chaussy's family is seven: his wife, his married daughter and her husband and three children. The family, including the children, get up at five o'clock. Breakfast is onion soup, bread made of whole wheat and rye, a home-made Roquefort cheese, and perhaps real coffee. The cows are milked, the manure carried out, and the animals fed. Chaussy and his son-in-law are in the fields at daybreak. If they are working in one of the more distant plots they take their mid-day lunch with them, a bottle of rose wine, which Chaussy made himself, a half loaf of bread, some cheese and an onion or two. When the sun or their stomachs tell them it is noontime, they sit on the tailgate of the cart, and lay their lunch out between them. They top it off with a hand-rolled cigarette of black Algerian tobacco. The horses are unhitched and wander along the edge of the field, cropping the grass, while the oxen stand stolidly to yoke.

They leave the fields at dusk. In the gathering twilight, as the shadows from the hedgerows stretch longer across the fields, Chaussy and his son-in-law return to the farmhouse. In the hush of the evening they hear the clank of trace chains from neighboring fields, the lowing of cattle and the subdued bleat of sheep from distant farms, and the rumble of homeward-bound carts along the country roads. They see the smoke wreaths from the hearth fires curling upward; dinner is making in the kitchens.

After the animals are fed and bedded Chaussy goes in to his dinner, the big meal of the day.

### What Does He Eat?

As he steps inside the door of the little kitchen, Chaussy sorts out the smells. There is the ever-present odor of the dung of animals and manure; to this Chaussy is

CHAUSSY RAYMOND helps his two grandchilden with their homework in the farmhouse kitchen. The pride of the family is the converted army radio. The pointer is useful on the rare occasions his son-in-law hunts grouse on his scattered fields.

oblivious, for it is of his own body. There is the animal smell of the cows and the pig in the sty a few feet away from the kitchen door, and the dog snoozing under the stove. His wife and daughter have lately finished the milking and there is about them the mother smell of warm milk, which is with them always, even when they have taken the weekly bath and dressed for Sunday mass. Chaussy finds the smell he searches for, the aroma of sage and onions mingled with the gamey tang of rabbit. He lifts the lid of the pot on the stove and takes a pleased breath of its contents; rabbit in a magnificent sauce, simmered on the stove all afternoon, tender and spicy. On the table are two lengths of bread with the carving knife beside them; a bowl of lentils, flavored with a small piece of bacon; a salad of endive, well laced with garlic; a quarter of a cheese, sharp and well-ripened; two bottles of his own good wine; and an apple for each of the family, to be peeled and eaten as a sweet. Then he will have a small cup of coffee, sweetened with saccharine. Since the work has gone well, and the wheat is in, Chaussy decides he will indulge himself with a glass of brandy in celebration while he enjoys his after-dinner cigarette.

Duck and chicken are regulars on the menu, but pork and beef are rare. On market days, if her own sales have been good, Madam Raymond may bring home some liver or tripe. When the pig is butchered there will be fresh pork, and some will be cured to stretch it into the summer. Sugar is scarce and the three grandchildren look forward to Christmas because it means a candy bar for each of them, and no doubt an orange.

Chaussy's shoes and those for his family are rationed. He still has a good pair of army shoes and a warm army coat. He wears rough cotton and wool jackets and trousers of well-worn corduroy. He has never owned a pair of gloves.

The Raymond farm has access to a power line, but little use is made of it. There is one motor. This operates a small pump which raises water to a tank in the loft of the barn and serves the stock. There is no water in the farmhouse. There are electric lights in the house and barn and in the kitchen is an army surplus radio. It is his one luxury, his concession to an advancing civilization. His wife has a sewing machine which the Germans overlooked. There is no icebox, no rugs on the floors, no electric iron, no fans, no washer, no toaster, no vacuum cleaner. The stove in the kitchen has a firepot about the size of a small hat. In this are stuffed twigs which the children gather each day in the thicket below the house. This thicket, which clothes the side of a steep bank, is a fortunate possession, for it furnishes fuel throughout the year. The three or four big trees in the thicket are registered in the Forestry Control and these Chaussy cannot cut without permission; but each year enough second growth comes up to keep the kitchen stove going.

### Price Controls

Not all the products Raymond has to sell are sold in the open market. Price controls exist at all stages of trade from the producer to the consumer for many agricultural products. These include cereals, fats and oils, sugar and dairy products. On meat, for instance, the control is applied at the packers or butchers; on beets, at the processors. The government may threaten to impose fixed prices, which Raymond detests, when the price of a commodity gets out of bounds. This occurred on potatoes last year. The threat sometimes brings the market into line; sometimes it does not.

The government uses price controls to encourage or discourage the type of crop or livestock desired. Because of the black market the price controls are of limited effectiveness except for crops like wheat or sugar beets processed at mills or refineries and thereby easy to control. Men, women and children on bicycles were always common enough sights on French roads, but their numbers increased with the black market. Ranging far from the cities, they search out the patty of butter, the egg, or the fat slice of bacon on distant farms. The practice is so general that little attempt is made to prevent it. Raymond's farm is sixty kilometres from Paris and on a side road which dead-ends at his farm, but he expects two or three callers a week and is able to sell practically all his produce to them, thereby eliminating Madam Raymond's weekly vacation in the village market.

That Chaussy would offer his life for La Belle France he indicated by serving through two wars, but to him, who has

grown his crops and his animals by the sweat of his brow and the ache in his back, price controls are a flagrant infringement of the rights of man. He senses that no government can enforce an unpopular law. The black market on which he buys and sells operates on this basic principle. If he is caught, which is scarcely possible, he will pay his fine. He knows that throughout the rural districts of France the government is closing its eyes to various subterfuges which people adopt to fill their bellies.

Although Raymond would much rather solve his own problems, he occasionally seeks the service of the Director of Agricultural Services at Montargis, the department center. The function of the director corresponds somewhat to that of a county agent in the United States. His influence and powers are, however, much more extensive under the highly centralized French administrative system. He is the key man in distributing seed, fuel, machinery and fertilizer. He may be able to make an official visit to each farm in the department once a year to offer advice on new crops, new machinery, and crop problems. Raymond regards him with the same skepticism with which he regards all officials, listens to him with rough but delicate courtesy, and goes back to his farming.

When he sold his wheat, as he was compelled to do, he received a good price in francs, in which he has very little faith. Educated by generations of forebearers who disdained banks, he places his faith only in gold money, or in foreign bonds, preferably U. S. Railways. He puts off selling his crop and his animals until the last moment, hoping that he can take the money quickly and turn it into something tangible before the francs slide farther down. He built up the money for his tractor through savings that he had nourished all through the war and money from the sale of his crops during the last two years. He has watched the franc go up and down; when it goes up he counts his gains and rejoices; when it goes down he spends sleepless nights. The purchase of the tractor would permit him to turn what he considers flimsy paper into real value, something that he can see and feel, something that will help him lighten his load of labor.

Raymond belongs to the C.G.A. (General Farmers' Federation) which makes recommendations for the allocation of fertilizer and machinery. He has no organization corresponding to the Farm Bureau or the Grange, and cooperatives are rare. He has heard that in some parts of France farmers are banding together to buy combines, but that innovation has not yet come to his community. He does not read the rare bulletins sent out by the Ministry of Agriculture, but before World War II he attended a short course in a Government Agricultural School, where he was told some things about fertilizer, soils, crops and stock. His knowledge of farming is practical, the result of many generations of careful study by a race of men of the soil. He has practical, horse sense reasons for his way of farming and scorns the superstitions, such as planting by the moon. At the end of the wheat harvest he takes part in the harvest festival. He is mildly impressed when the priest blesses the new crop, but is more interested in meeting his friends at the Cheval Blanc after the ceremony. He practices erosion control instinctively. The sleepest slopes on his many parcels are covered with thickets or hedges. On the easy slopes he plants on the contour. The steep slopes he aims to keep in grass and forage as much as possible.

BABETTE RAMBEAU, the Huguet milkmaid, milks the cows, stores the milk in earthenware jars, skims the cream and churns it in a barrel churn. She does not drink milk, regarding it as a fit food only for babies and for those who don't have wine.

### America The Beautiful

Chaussy's three grandchildren go to the communal school in the village—walking each day the mile and a half to the village. They are taught the three R's, geography, history, a science and some language. This year there was an innovation. In the upper grades they are learning about America. Heretofore they had had some English and German history and of course learned a great deal about the glorious past of France, but this year from Paris came the news that American History was a required course in the public schools. They were delighted because they had seen movies of Indians and cowboys and frontier life and they knew that America was being asked to help feed them. They are revelling in the romantic history of this golden land of America, the land of opportunity. Many of them are determined to go there when they grow up. After her first lesson, Chaussy's nine year old granddaughter came home and announced.

(Continued on page 122)

THE PAYOFF: this load of soybeans is worth $700.

# Soybeans And The Soil

**Soybeans can be either good or bad for the land, depending on how they are handled in the rotation.**

MOST farmers no longer believe the myth that you can take a soybean crop out of the soil year after year and yet leave it richer and more productive. During a good part of the one hundred and forty-odd years since soybeans came over from Manchuria, they have been living in the farmers' dream world, a world in which by some magic you can pour water out of a jug forever. Farmers thought that because they were a legume they were a soil-building crop.

There is no magic about soybeans. Like any other crop they take nutrients from the soil and air, and what they take out must be replaced in order to maintain fertility. Continued soybeans on a field will soon leave it worn out and exhausted.

The sky rocketing prices paid for soybeans during and since World War II have dazzled farmers to such an extent that they overlooked almost everything else, the good they might do, their bad features, and their proper place in our family of farm crops. They take proper handling, the same as any other crop, or else your farm suffers.

Soybeans and the soil fertility, soybeans and erosion, and the place of soybeans in the rotation are matters which might well be reviewed and a check made on the present and future welfare of every farm on which they are grown.

Today there are farmers on both sides of the soybean fence. A few damn them as robbers of soil fertility; a few others still hold that they build up the land. Experience has taught observant farmers that the soybean is neither a villain nor a hero.

He is just an average fellow, with a little good and a little bad in him, even as you and I.

For a hundred years after the soybean came to this country, it was grown mostly in home gardens as an Oriental curiosity. State experiment stations began serious work with it in 1890. Scientists gradually developed new uses for it in everything from livestock feed to plastics. Prices went up and during the 1920's farmers began to plant soybeans in ever increasing acreages. We were no longer importing them from Manchuria. By 1933 our farms were growing 10 million bushels a year. In 1941 the figure had reached 94 million bushels and during World War II, farmers sent to market 170 million bushels of soybeans annually.

On many Midwest farms oats dropped out of the rotation to make room for soybeans, and they began to replace some corn when the cash return jumped with increasing demands. The average gross income from soybeans today is about $60.00 an acre, and only corn is more widely planted as a cash crop.

### Soybeans and the Soil

Soybeans travel the middle of the road in their relation to soil fertility. Whether or not they are hard on your land depends on the way you handle them. They add more nitrogen to the soil than does corn, oats, or wheat, but these grain crops take more potassium, phosphorus, and magnesium from it as a general rule.

Because soybeans are a legume crop, they have the ability to take part of their nitrogen from the air, and nitrogen is the most expensive element in commercial fertilizers. When inoculated properly they can take nearly all of their nitrogen from the air. The rest comes from the soil. If there is nitrogen in the soil they won't bother to make their own, but when it is lacking they can supply as much as they need.

The fact that soybeans can manufacture their own nitrogen doesn't insure more fertile soil. When they are hauled from the field as hay, the nitrogen is trucked off with them. If just the beans are combined and the straw is spread evenly over the ground, small amounts are salvaged for the next crop.

When a soybean crop produces two and a quarter tons of hay or 20 bushels of seed per acre, the farmer can add 88 pounds of nitrogen to the soil by plowing his crop under for green manure. This is as much nitrogen as is contained in 880 pounds of 10-10-10 fertilizer. If the beans are cut for hay and the manure returned, they add 26 pounds of nitrogen. When the beans are combined and the straw left on the ground, there is an addition of 16 pounds, but when both seed and straw are hauled off and none of the plant returned, the farmer has taken off with the crop a total of 30 pounds per acre. To return to the soil the nitrogen, phosphorus,

THE FARMER above is not cooperating with nature. When he plows up and down the slopes instead of on the contour he invites the erosion visited on the field below.

and potassium that this crop used, the farmer must spread the equivalent of 300 pounds of 10-10-20. The 10-10-20 will replace the nitrogen and phosphorous removed and slightly more than the amount of potash that the soybeans used. Soybeans are not a crop that can be grown indefinitely without adding fertilizer someplace in the rotation. It is plain that soybeans are easy on nitrogen, but they are gluttons for potassium and phosphorus.

Even when the crop is harvested as beans the farmer may lose the nitrogen unless he acts fact. A fall-sown grain crop, such as wheat, oats, or barley, should be seeded the same season to catch the nitrogen before it is leached out.

### How to Fertilize

Any land that will grow corn will grow soybeans. If it will produce 50 bushels of corn to the acre, it should grow 20 of soybeans. For both corn and soybeans, the soil should be in a good state of fertility, and to keep it fertile the farmer must add adequate amounts of 2-6-12 or some other fertilizer to replace what the plants use.

The first step in any fertilizer program is to learn what the soil needs, for it is best to fertilize the soil and not specific crops. Every farm differs in fertility problems. The farmer can learn the requirements of his fields by calling in the county agent, or the Soil Conservation Service. Once the farmer knows what his soil lacks he can begin to add the proper fertilizers to build it up and at the same time take off cash grain crops.

There have been cases where a poor, run-down field has grown a fair crop of soybeans. These crops are gifts of nature, however, and can't last unless the farmer begins to return something to the field, for each crop of soybeans that he takes off robs the soil of more of its fertility.

Some farmers add fertilizer directly to the beans while others concentrate on fertilizing the corn and small grains. There are arguments for both practices.

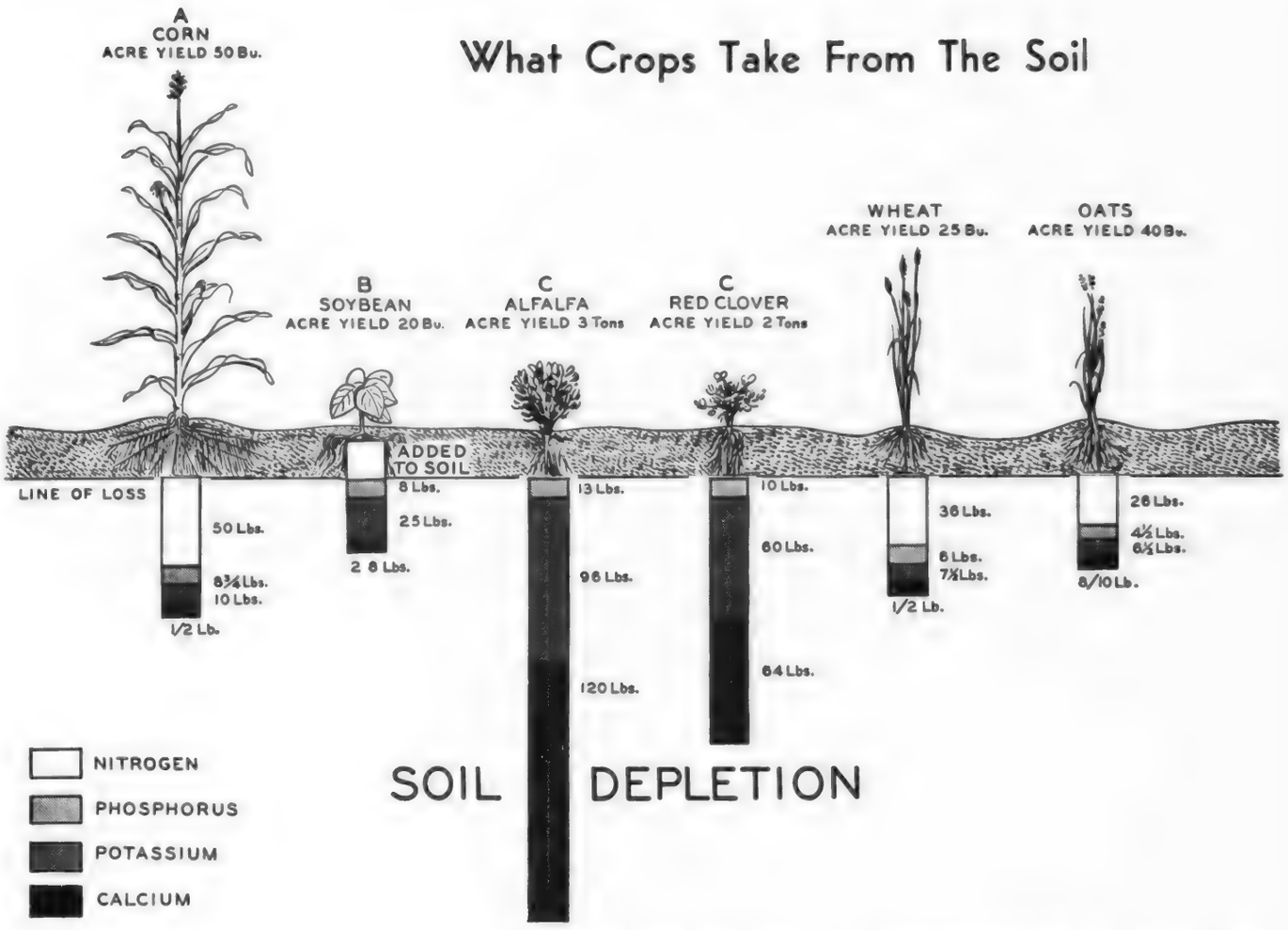
Some successful soybean growers, like Dave Wing of Mechanicsburg, Ohio, add fertilizer to every grain crop in the rotation. Wing says, "My aim is to build up the general fertility of my land. The soybean scientists tell us that adding fertilizer directly to the soybean crop on these rich lands doesn't give increased yields of beans. They're right, but I can't add all the fertilizer that I want to put on just by applying it to the corn and wheat, unless I broadcast some of it. The grain drill won't put on more than 300 pounds to the acre, so we fertilize the soybeans, too. We are getting better yields of beans now than we used to, because our fields are more fertile."

Farmers who are content to add less fertilizer to the four-year rotation of corn, wheat, soybeans, and hay should apply the fertilizer to the corn and wheat for best returns. On acid soils two to three tons of finely ground limestone per acre will do more than any other fertilizer to increase yield. Farmers on poor land should fertilize the soybeans directly and supply the beans with the plant nutrients that the soil lacks. If fertilizers are used only for the benefit of the soybeans they should be high in potassium and phosphorous for the beans will manufacture their own nitrogen.

If soybeans must be grown on the same field year after year, there should always be a crop of rye seeded after they are combined each autumn. It can be turned under the following spring to add humus to the soil. The risk of disease is great.

The cheapest insurance a farmer can

A COMBINE is expensive but it helps to keep soybean land fertile. The straw mulch left on the surface behind the combine adds as much as 16 pounds of nitrogen per acre to the soil. This is equivalent to the nitrogen in 400 pounds of 4-8-8. The mulch is also a blanket that covers the field and protects it during hard rains.




**SOYBEANS WERE FIRST billed as soil builders because they are a legume. Then farmers learned that they could deplete the soil and the pendulum of popularity began to swing in the other direction. The true picture on what they take from the land is shown in the above chart based on studies by the University of Illinois.**

give his soybean crop is inoculation. It is especially important on the poorer soils where beans must make their own nitrogen.

Inoculation often means the difference between a good crop and a poor one. Controlled experiments at the Illinois Agricultural Experiment Station produced 11.9 bushels more seed per acre with inoculated beans than those planted without inoculation.

### Soybeans and Tilth

Soybean ground works easily; it has good tilth. Following a crop of beans, water and air can enter the soil freely and farm machinery finds it easier going than after corn or other grain crops.

Soybeans give better tilth in three ways. The leaves shade the soil and protect it from crusting. The roots break the soil down because soybeans have deeper roots than grain crops. Their roots may penetrate to depths of four or five feet. Soybeans, because they are legumes, foster more rapid bacterial action in the soil and this, too, helps break the soil down and make it easy to work. Beans do improve the working condition of the soil, but here, too, they travel the middle of the road. Alfalfa, sweet clover, and other legume hay crops do a better job because their roots may go as much as 10 feet deeper.

Loosening of the soil can have its bad points. When soybean land is plowed in the fall, it may run together to form a crust. The plowing pulverizes the soil and winter rains pack it down.

### Good Green Manure

Well-noduled soybeans make an excellent green manure crop for adding nitrogen to the soil. Most farmers who grow soybeans, however, plan to sell them on the cash market rather than plow them under, for the same reason they sell corn on the cash market. Soybeans bring a high price per bushel and this usually persuades the farmer that he'll take the cash and let the credit go. Soybeans rarely get the chance to show what they can do as green manure. The cost of seed is high, up to $5.75 a bushel for certified seed last year. Seed for an acre of drilled beans costs $11.50 and to plant them in rows costs half as much. Alfalfa and sweet clover are plowed under more often. With their longer roots, they are even better for the soil and if sold will bring in less cash per acre than soybeans.

There are cases, however, where it is wise to turn the soybeans under. If the crop does not produce enough seed to pay for combining and hauling to market, all is still not lost. The soybeans can be plowed under and become one of the best soil-building green manures a farmer can use.

### Soybeans and Erosion

Soybeans on sloping land are often responsible for serious soil erosion. The farmer who grows beans can control this erosion by the way he handles the crop. Soybeans are usually planted in rows and cultivated like corn. Any cultivated row crop can cause erosion on sloping land unless the field is contoured or terraced, to slow down the water that runs off during hard rains.

On sloping land always plant soybeans on the contour. On short slopes drill them solid. Long slopes should be strip cropped or terraced, and soybeans here can be either drilled or planted in rows like corn. In addition to these measures, erosion insurance can be added by planting an early variety to permit early harvest. When soybeans can be harvested early in the season, a small grain crop can be seeded and have

MOST OF A SOYBEAN crop is above the ground for only one tenth of the plant is root. The roots, however, penetrate the soil deeply and give it tilth. The nodules are nitrogen trappers and inoculation stimulates their growth for more fertility.

a good chance to get a foothold before winter rains begin.

When soybeans follow sod crops, they will cause no more erosion than will corn or other row crops. If they follow corn on sloping land, however, erosion may take away a good fraction of the top soil. This is not the fault of soybeans, but is caused by growing two row crops on the same field without a cover crop between them. Two crops of corn in succession will do the same thing. Soil losses when beans follow clover are about one-third as great as when they follow corn.

If soybeans are harvested with a combine, the straw acts as a shock absorber to take the force out of hard rains, erosion is slowed down, and the soil can hold more water because of the crop litter on the surface.

When soybeans must be planted on hillside fields, they should be planted only once in every four or five-year rotation. They should be planted in place of corn rather than in addition to it and can be grown safely only if the land is farmed according to soil conservation practices. Even then they are risky business.

### Soybeans and the Rotation

Soybeans fit easily into most Midwest rotations. During World War II, however, farmers considered rotations a peacetime convenience and planted corn and soybeans repeatedly to produce the feed and food the country needed. While we benefitted with the products that came from the soybeans the soil suffered. Every corn belt farmer who grows soybeans has his own idea of the best way to fit them into his rotation. Some give the soybeans more acreage than they give to corn. Others stick to corn as their favorite cash crop and limit the soybeans to a few acres. Their main concern is to fit their rotations to the needs of their farms and make some allowance for what they expect the market prices to be at selling time. Illinois and Indiana farmers for the past four years have been growing one acre of soybeans for every two and a half acres of corn. Ohio has grown one acre of beans to three of corn. Iowa, one to five, and Missouri, one to six. Within these high soybean producing states, there are individual counties that have given corn second place.

Generally speaking, corn belt rotations should include cultivated row crops, close growing grain crops, and deep rooted legumes, or other sod crops. This combination gives the farmer a chance to make a profit and the soil a chance to stay fertile and work up well. This plan should be altered in view of the fertility of your fields and steepness of the land.

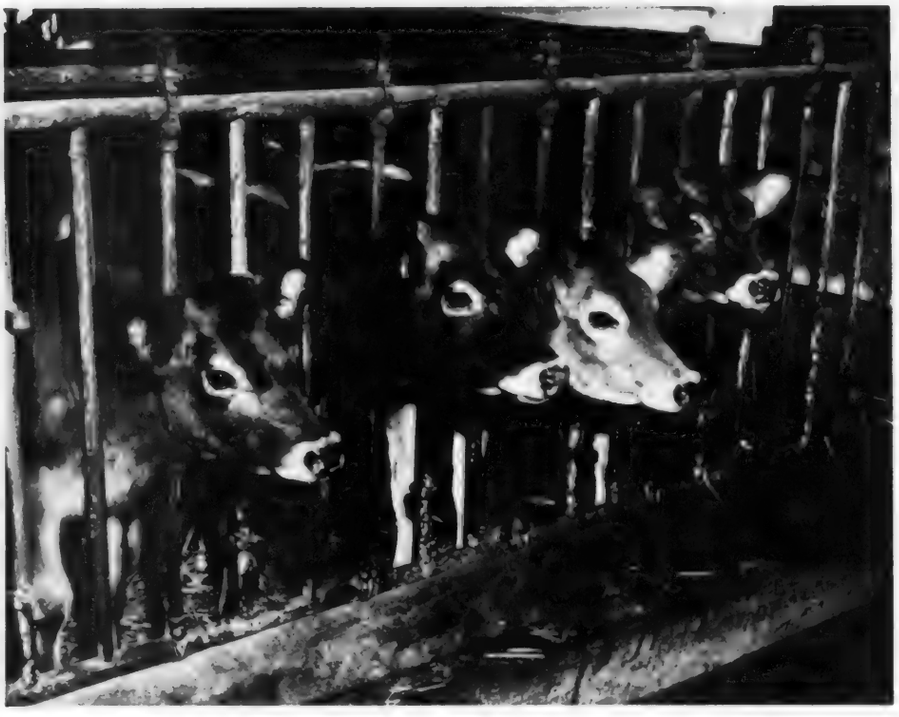
Where the corn borer is a problem, soybeans can help fight them. Corn stalks which harbor the insects are usually plowed under before soybeans are planted, but are only cut up by the disc when wheat or oats are planted on corn stubble. When they are plowed under, the corn borer larvae are killed. A good flat land rotation in corn borer country is one year each of corn, soybeans, wheat, and clover. On hillside fields, however, this rotation subjects the land to erosion because corn and soybeans are planted without a sod crop between them. The best plan is to use an inter-crop of rye following corn. On grain farms the rotation is often corn for one or two years, soybeans, small grains, sweet clover for green manure or a clover seed crop.

Wherever the farm, the owner must vary his rotation to meet such special circumstances as the labor shortage and livestock needs. Some farmers, on very rich land, work their soil more heavily and plant it to corn for several years, followed by one or more years of soybeans, then back to corn. This system works well only on some river bottom farms where periodic floods enrich the top soil. On higher and rolling fields, however, it will eventually sap the plant food from the soil and yields will drop unless fertilizers, lime and green manure crops are added to correct the soil losses.

With good rotations, farmers on fertile Midwest farms are able to meet their feed needs, sell soybeans for cash and still keep their soil in good shape by applying fertilizer at the right times. On hill land the rotation should be five or six years long and include only one crop of soybeans.

The soybean has made a place for itself on American farms, but it no longer is a wonder plant. It is known now as a good cash crop that requires wise handling if it is to yield 20 to 30 bushels of seed an acre and still leave the soil fertile.

**THIS MIXTURE** of soybeans and Sudan grass, being plowed under, is a sacrifice to the following crop. A crop of soybeans that would produce two and a half tons of hay per acre will add 88 pounds of nitrogen to the acre when turned under. They also give better tilth. Soybeans are one of the best green manures a farmer can plow under but their value on the cash market usually persuades him to leave them for harvest.



THE FOUR JERSEY calves were fawnlike creatures with large, dreamy eyes.

# *A Bill for Horace's Bull*

*Being the Adventure of four Jersey Calves, true Aristocrats, and Horace's Bull, who had mixed Ancestry, and could jump Fences.*

BY ALFRED S. CAMPBELL

ONE warm spring day we went out and bought ourselves four Jersey heifer calves, fawnlike little creatures with large, dreamy eyes and satin coats. They were aristocrats, descended from many generations of high-producing ancestors, and with them as a beginning we hoped to establish a pure-bred dairy herd.

During summer and fall they grazed in the lower pasture. They drank from the tiny brook which meanders through the meadow, licked the big block of salt placed in one corner, lined up morning and night for their ration of grain, and they grew amazingly.

Fall merged into winter. Now their home was in the little stone barn, and in place of grass they ate clover hay from a big rack. Twice a day, no matter what the weather, we let them out. They would start at a walk down toward the brook, then suddenly break into a wild, eccentric gallop, tails raised, heads and rumps tossing. After their drink they would return slowly across the frozen ground, nosing at tufts of dead grass in a reminiscent sort of way.

The next spring they went out on pasture again, much larger now, and already losing their baby contours. They grew rapidly during May and June and July. Then we found that the grass in their pasture was getting very short. There wasn't room in the other pastures for them, so we went over to see our neighbor, Horace.

Horace has a large farm, mostly neglected pastures and broken-down barns and sagging gates. He's always just about to get the place spruced up, but something always comes along, and he puts it off. Yes, he told us, he had a nice pasture that he'd be willing to rent for the balance of the summer.

We looked it over; lush grass with a fair sprinkling of clover, two big oak trees for shade, a good brook. The fence, however, was down in half a dozen places. Horace said he didn't have time to repair it, but if we would do the work we could have the pasture for five dollars a month. It was high, but there wasn't any choice.

We fixed the fence; braced all the corner posts and strung new wire where needed, which was in a lot of places. When everything was shipshape we led the heifers over. For fifty cents a week Horace agreed to feed them their grain, which we supplied. Every Sunday we walked over and looked at them. They certainly were making fine heifers.

When the first heavy frost arrived we brought them back to the barn, after paying Horace. We had found, not far-off, an exceptionally fine Jersey bull, and had made arrangements to have the heifers bred in December. Then, the following fall, we would have four heifers giving milk and four more little calves to go on with. We hoped they would all be heifer calves, and be as good as their dams.

On election day Horace dropped around to see us. We figured he had a favorite candidate to recommend, a little late, to be sure, but that was his way. However, during the next half-hour his conversation covered a dozen subjects, none of them related to politics. We knew he wanted something and was working up to it, as they do in these parts. To come right to

(Continued on page 142)

HORACE'S BULL, THE VILLAIN IN THE PIECE

# THE POINTS OF A HOG

BY ROBERT ZINN

AXEL BJORENSON, Iowa hog farmer, was selling out; the auctioneer had worked through the "other articles too numerous to mention" and the implements and had come to the hogs. Axel had some good hogs; not registered, but a graded up bunch of mighty fine gilts, a half dozen brood sows with litters, and a good boar or two.

The bidding was brisk. The gilts were soon disposed of and four of the six sows were off the block. They had brought good prices; the spread was slight, within a few dollars, mainly depending upon the number of pigs. The fifth sow, with eight six-weeks-old pigs, brought a new bidder into the ring. A big man, in a clean blue shirt with muddy denims, was determined to have the sow, and she was finally knocked down to him at $20.00 above the highest the others had brought.

To the casual observer there wasn't ten cents difference between the six sows, but here was one that had something extra that was worth twenty dollars to the big man. He saw quality, which in his lot meant more dollars at market time, and he was willing to invest more to get more.

Some people call judging a hog an art. But there is no magic about it; the man in the blue shirt wasn't born with it. He had never finished a hog for the show ring, and in his opinion the best use for a score card was to start the kitchen fire. Yet he could spot a good hog across a twenty acre pasture. What sixth sense or intuition did he call on when he bought a hog?

This ability was acquired from years of close association with hogs. The fine points of swine quality, those little details of conformation and temperament which slip past the average hog farmer, are the very things this man made mental note of and used in judging this animal.

For example, he learned, by the hard road of experience, that the temperament of a sow (which governs the manner in which she will conduct herself at farrowing time and while caring for her litter) can be read by close observance of her eyes. It is there, as in an open book, and

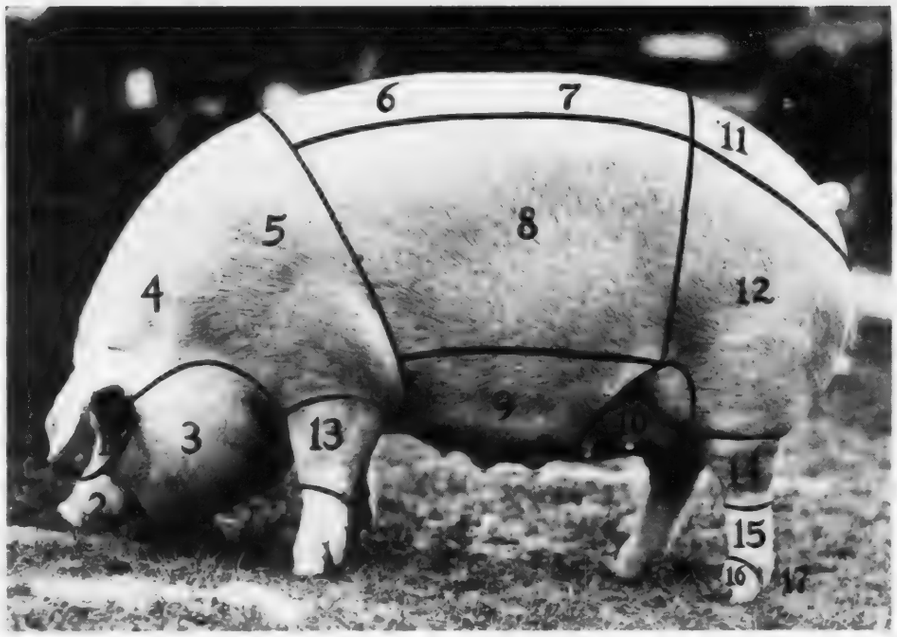
legible to the hog man who devotes the time and study necessary to learn how to read it. Gentle disposition, maternal instinct, calm nerves, are all clearly reflected in the eyes; but only the man who takes the time sees them.

The mentally alert and observing herdsman soon learns that definite things are associated with good production. He also learns that, fortunately, many of these things are dominant from the standpoint of inheritance. Give him time to check and double check these characteristics against productive results and a good hog man can set up a mental system of checks and balances to act as his guide when buying breeding stock.

By the time a hog raiser acquires skill along these lines the process has become a part of his nature. He is unconscious of what is going on in his head and would probably have difficulty explaining, if asked. For this reason the thing he does may appear to be the result of hunches and magic, when in reality it is a highly developed skill.

Let's take a look at another very important angle in selecting a brood sow, one that requires little or no skill to judge other than the ability to count up to twelve. This is simply the matter of how many teats or "dinner plates" a sow has. Each pig must have his place at the table, and no sow can raise more pigs than she has dinner plates. The discriminating farmer wants his brood stock to have 12 sound nipples, six on each side. He knows that as a general rule his sow will not have more than 12 pigs, therefore, each is assured of a place at the table. Even though he is relatively sure not many sows will need all 12 teats, yet he wants to be certain, just in case. He hopes and plans for the maximum number of pigs. For these reasons the careful farmer will not save or buy breeding stock with less than 12 good teats. To be sure, in some cases even 12 places at the table are insufficient, but when such a situation arises the extra guests are distributed among the less productive mothers.

Another intangible factor unconsciously observed by our good hog man is the relative proportion between the length and depth of his animal. Year in and year out observance of sows at farrowing time soon teaches the alert hog raiser that good length and depth of side are closely associated with good litters. Common sense tells him that the unborn pigs require a certain amount of room inside their mothers. He knows full well that eight or ten pigs require more space than five or six. And it is easy for him to see that short coupled, shallow bodied sows can not possibly deliver the size litters he demands. Sows that produce small litters are very unpopular with their owner; he views them with disappointment and disgust. But it's quite a different story with that good old matronly sow who lies down quietly twice a year and finishes up with ten plump little fellows tugging at her vest. She is looked




THIS FINE CHESTER WHITE, very near an ideal for her breed, has been lined off to show the parts of a hog as follows: 1. Face, 2. Snout, 3. Jowl, 4. Neck, 5. Shoulder, 6. Back, 7. Loin, 8. Side or rib, 9. Belly, 10. Flank, 11. Rump, 12. Ham or thigh, 13. Knee, 14. Hock, 15. Pastern, 16. Toes, 17. Dew claws.

FEW SOWS have all the good points. This great grandmother is prolific, farrowing twice a year regularly. She has twelve ample buttons and she sets a bounteous table, but only her own children could see anything feminine in her head.

WHEN YOU WATCH a litter of pigs grow up and you finish some for market and breed a gilt or two that you like, you get to know the good ones from the bad ones and you don't need a score card or a ring judge to tell you which is which.

upon with pride and admiration. As she moves about the lot, the outline of her productive form is stamped indelibly upon her owner's memory.

Our farmer also learns things about hogs at places away from the feedlot and farrowing pen. Being progressive and up-to-date in his thinking he attends the adult farmers' evening classes conducted by the local vocational agricultural instructor every winter. Here he broadens his thinking and develops an industry-wide perspective, profiting by the experiences of others in the hog business. Also he goes on tours to the stock yards and packing plants. Here he sees live hogs of different types discussed by professional animal husbandmen and buyers for the large packing firms. Then he is privileged to see these same hogs after they have been slaughtered and cut-up. From these experiences he is able to add another important section to his subconscious mental picture of the ideal hog. He gathers a backlog of information that will help him watch for and develop the type of hog that will produce a maximum of the prime cuts with a minimum of lard. He remembers all too well the lard glut that followed World War I and he wants nothing of that kind again.

This is how our big man in the clean blue shirt and muddy denims developed the ability to look at the sows in the ring and know where to place an extra $20.00 to good advantage. Sure, some people call it intuition and others call it luck; but to those who know, it's a skill developed only after years of the keenest kind of study and observation.

Now, let's swing the pendulum in the other direction and see how a professional hog judge learns to pick out a good hog. If he is a college man he is likely to be scientific in his approach. No haphazard catch-as-catch-can methods for this fellow. He sets about his task with a definite, methodical system. First of all he develops a thorough thinking and speaking knowledge of the terms and phraseology that go with his work. In order to develop this vocabulary and the ability to know a good hog when he sees it, he goes through a definite mental and visual training program. This program can be broken down into six steps, as follows:

*Step I: Learning the parts of a pig.*

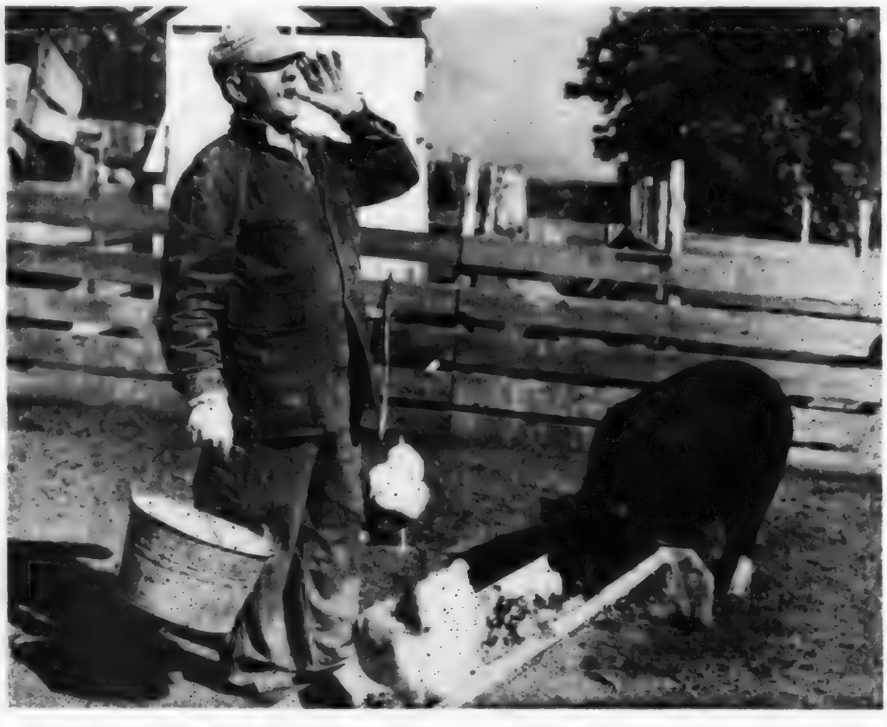
On page 35 is a picture of a hog on which are labeled the main parts. An intimate knowledge of the names and locations of these parts is a prerequisite to good hog judging and a necessity if the judge is to give sound reasons for his judgments. It is very difficult to speak descriptively about a hog without using these terms.

*Step II: Becoming familiar with the score card.*

The score card is merely a listing of the various parts of a pig with an evaluation placed upon each part according to its relative importance in show ring selection. It so happens (and a good thing it is, too) that there is a close correlation between relative score card values, packer evaluations, and the farmer evaluation of some of the parts of a hog. There are also parts of the hog that are evaluated by the score card which are of little or no concern as far as the packer or farmer is concerned. These are the parts of the hog which the breed association and the show ring believe to be important as far as their particular needs are concerned. They do not necessarily influence the commercial value of the animal as a meat producer. A chop from a good feedlot hog is just as tasty as one from a blue ribbon winner.

The judge becomes familiar with the score card evaluations so that in actual practice he will know where to lay emphasis when making decisions between several animals. A second value, perhaps as great as the first, which the judge gains from a study of the score card, is a knowl-

THE FARMER who puts in the hours fattening his hogs for market is likely to forget the credit due the ring judges and the professors for betterment of all breeds.



edge of the descriptive terminology given about each point. These various descriptions tell how that part of the hog should appear if he were a perfect hog. They are clearly and concisely stated and can be used in any discussion where it is necessary to describe a whole hog, or any of its parts.

All score cards are essentially the same, although no two are exactly alike in every detail. The card given herein has some additional information (in italics) not found on a card used strictly for selecting purposes. This information is added to show the relative importance of the specific points on the desirability of that hog for slaughtering purposes. This does not necessarily mean that the market price of that hog will be changed, however, since packers buy hogs by the pound and not by the desirability or undesirability of their carcasses.

## A SCORE CARD FOR MARKET BARROWS

*Points Considered* — *Perfect Score*

WEIGHT . . . . . 10

*The heavier the hog, of course, the more pounds the farmer will get paid for. He will only receive top price, however, for hogs within the weight range that is making top on the particular day they reach the market. This varies from week to week throughout the year. Two hundred pounds has been the average desirable weight in the past year.*

GENERAL APPEARANCE .. 10

Type . . . Deep throughout; medium width; medium low-set; not rangy; not chuffy.

Size for age . . . Large; early maturing.

Symmetry . . . Moderately long with evenly arched topline; straight trim underline; uniform width; balanced proportion; smooth; not low at the shoulders.

*These items affect the price the farmer receives for his hogs only in that they are characteristics which make for a more desirable hog from the standpoint of being a good doer in the feedlot. Such a hog of course gains faster and more economically for the feeder and he thus makes more money.*

CONFORMATION 52

Head . . . Medium in length of snout and face; broad between the ears.

Jowl . . . Medium sized, not flabby; smoothly joined to the shoulder, trim, free from wrinkles.

Neck . . . Short and deep, joining head and shoulders smoothly.

Shoulders . . . Compact on top, deep, smooth, even with the sides.

Back and loin . . . Strong, evenly arched, medium uniform width.

*These are largely showring and breed factors.*

Sides . . . Deep, long straight, full; ribs long, carrying fullness well down.

*This again will influence the money the farmer will make on his hogs, but in an indirect manner. Hogs (especially sows) possessing these characteristics are better doers and producers than those not carrying these attributes.*

Belly . . . Trim, smooth, firm, lacking wastiness; underline straight and smooth, not cut up in the flank.

Rump . . . Long, medium width, rounding slightly from the loin to tail head, not drooping; tail not set too low.

Hams . . . Broad, thick, deep, well filled at base; firm and smooth.

*These are showring and breed factors.*

Legs . . . Medium length, straight, set squarely, well apart; pasterns nearly upright, toes close together.

*This is a factor desirable from the standpoint of the breed, the show ring and also the feeder.*

CONDITION 10

Body . . . Fat, wide, full, plump, smooth.

*Affects the farmers price only in that fatter, more highly finished hogs weigh more over the scales. Of course, hogs that are too fat frequently bring a somewhat lower price. The extra weight may offset this.*

Jowl and cheek . . . Light and plump.

Shoulder, back, loin and rump . . . smoothly covered with flesh.

Hams and twist . . . Thick, plump and firm.

*Show ring factors.*

QUALITY 8

Bone . . . Legs smooth, neat, tapering; feet medium sized; snout not coarse; shoulder not prominent; tail fine.

Skin . . . Smooth, free from wrinkles on face, jowl, shoulder, loin, side or ham; ears fine textured, medium sized, neatly attached.

Hair . . . Fine, straight, laying close to body.

Flesh . . . Smooth, even, firm and free from flabbiness at jowl, foreflank, back, belly and ham.

*Factors only of show ring and breed consequence.*

DRESSING PERCENTAGE 10

High . . . As shown by a trim middle, approved form, high condition and superior quality.

(Continued on page 133)

**A HOG doesn't have to weigh two hundred pounds before you know what grade he is. Old hog men can take a look at a day-old litter and pick the prizewinners.**

THIS DESERT FARMER has trapped the waters of a mountain stream for his corn and alfalfa. The corn is cultivated by hand.

# DESERT CORN

BY DOROTHY L. PILLSBURY

CORN, to the natives of Spanish ancestry and to the Pueblo Indians of New Mexico, is more than a crop. It is life itself, woven into their customs, their arts and their religion since before history began.

How corn got into our Southwest, nobody knows. There are no wild plants resembling it in the whole country. Wild corn has never been found. But get here it did, probably from Old Mexico where the Mayans grew it a thousand years before the Christian era. Even in New Mexico old charred corn cobs have been dug up in ancient Indian ruins that date back 2000 years. According to a Navajo legend a turkey hen came flying from the Morning Star and shook an ear of blue corn from her wings.

To this day you can go back in the mountains of northern New Mexico and find Spanish villages in which Don Quixote would feel very much at home. The centuries have jumped right over the squat little adobe houses huddled about their sun-bitten plazas. Sheep bleat from wattled corrals and at nightfall the goat boy drives home his bell-tinkling herd over a ruler-edged purple mesa top. Along streams tumbling from dark mountain heights are minute irregular fields. Here grow pinto beans, chile—and corn.

The Midwest farmer, accustomed to hundreds of acres of tall lush corn, to tractors and all modern agricultural aids, would scoff at the scrubby corn with its ears growing close to the earth. He would scoff also at the equipment, a lop-eared burro, a frail turning plow and a couple of battered shovels and hoes.

Like the Pueblo Indian the native farmer grows two kinds of corn, the flint

for hominy and a softer variety for meal. He grows it in many colors, yellow, red, blue, purple and white with black tips, but blue corn is the favorite because it is thought to make the most nutritious flour.

As you pass the deep-set little windows of village homes you hear the slap of a woman's brown hands patting out the eternal tortilla, the Spanish version of the American pancake. That blue corn tortilla goes everywhere the native goes. It goes with the shepherds to high mountain pastures. The goat boy folds a couple and carries them in the recesses of his ragged shirt. If the family is very poor and owns no forks, a tortilla rolled like a cornucopia serves the purpose and has the added advantage that it may, itself, be consumed.

In October, little village houses are almost concealed by strands of drying chile hung against sunny brown walls. On flat roofs dry onions, pumpkins and golden squashes. Everywhere hangs the varicolored corn tied in bunches. In the old days, these bunches of corn were used in place of money. They paid taxes and debts. They were used as legal tender —so many bunches of corn for a buffalo robe or a horse.

Modern agricultural experts take off their hats to the village farmer who conquered the desert and made it feed him. Three centuries ago his ancestors followed the Spanish conquerers into a vast, inhospitable, arid land. The nearest base of supply was a thousand miles away over "The Journey of Death" in Chihuahua. It was dig in or die for the Spanish settler. He dug in, and today he remains rooted to the same adobe soil. Although he lost most of his grazing land to a more aggressive race, he has seldom parted with his irrigated fields. He would not sell them; he would not mortgage them. He loves and cherishes his adobe soil.

It is doubtful if the Spanish villager could have held on in this semi-desert if it had not been for the nearby Pueblo Indians and their corn.

Corn was growing in New Mexico when the first Spanish explorers came across the desert wastes into the country. Here on a spur of the Rocky Mountains that extends like a mile-high shelf into what is now Arizona and New Mexico, had developed one of the strangest civilizations the world has ever seen.

Unlike the migratory Indians of the Plains, these Pueblo Indians lived in compact little city states, in adobe apartment houses three and five stories high. The corn field was the anchor which held them. They were prosperous and civilized. They had a democratic form of government and a social and religious life that suited them. They were expert weavers and pottery makers. They were good farmers. They knew the skill of irrigation —and they grew corn. Corn was their life. It was more than that—it was a good part of their religion.

How did the Pueblo Indian, often far from water, manage to grow corn? He did it as some of them do to this day. He dug holes eight to twelve inches deep and buried ten to twenty grains in each hill, with the hills ten feet apart. Then he watered each cluster by hand as one would a house plant. When thunder showers came in summer he dashed out and diverted the brief downpour to his corn hills. He protected it from desert winds by windbreaks of brush. In early times he used a sharpened stick in lieu of a hoe for cultivation. Deep rooting and everlasting cultivation was the answer. Centuries of seed selection produced a hardy deep-rooting variety that would germinate with little moisture and mature rapidly in the short growing season of a mile high altitude.

As corn meant life itself to the Pueblo dweller, his religion and his social life were built around it. There were ceremonial dances in spring that the Great Spirit would send summer rains; and in autumn there were festivals to celebrate the harvest. Young brides and babies are dusted with the corn pollen to assure them of fertility. It is used in the marriage ceremony and at christenings. New houses are blessed with it. A present of corn is a sign of friendship. A perfect new ear is placed beside a new-born child. An ear of corn is the badge of membership in a medicine society. It is the symbol of life.

Perhaps the most poignant part corn has ever played in all its romantic history took place in the summer of 1946. The Pueblo Indians try desperately each year to save a portion of their corn crop against possible famine. But when they heard through their many sons in uniform of starvation in Europe, they offered their precious hoard to the late Fiorello LaGuardia, then head of UNRRA. This is part of a letter they wrote him: "Us Pueblo Indians been living in this country long time. Our peoples pray and dance for rain and live right. Our old custom tell us to save every year part of what we raise. Looks like those peoples and childrens over there got emergency. Pretty hard for peoples and childrens to forget the war and live the right way for peace with empty bellies. So we say we haven't got much saved—but maybe we can help."

**THE MEAGER CROPS of corn and peppers, the basic foods of the Indians and Spanish of the desert, are hung to dry in front of the home. Hybrids are unknown in the desert.**

FERTILIZER IS THE KEY to a pond full of all sizes of fish. Any pond will support some fish. Without care a one acre pond may produce only 20 pounds of fish a year, but when properly handled it can add from 150 to 250 pounds of food to the family table annually. The weight of fish a pond produces depends on the fertility of the water. Commercial fertilizer stocks the fish pantry with plant food and kills under water weeds. To keep fish fat and happy spread 100 pounds of 8-8-4 or its equivalent over each acre of water from eight to 12 times each summer.

# Fish On The Farm

BY EARL FRANKLIN KENNAMER

FARMERS like to fish if they can find time, but they seldom get away long enough to invade mountain streams in search of trout, or drift in a boat on a quiet woods lake. The best chance they have to enjoy the anglers sport is to have their own farm pond. If they manage their pond right there is always a spot close at hand where they can exercise a rod and reel for an hour or so when the evening chores are done.

The average farm pond is not large; perhaps it covers an acre of land. But a one-acre pond, properly cared for, can supply plenty of water for the stock, and fish for the family table the year round.

A farmer who gives his one-acre pond the proper care needn't fear an empty creel. A year after stocking he can, with hook and line, harvest from 150 to 250 pounds of "table-size" fish annually. This yield may consist of bass that weigh three-fourths of a pound to a pound and panfish that weigh three to five ounces. The annual yield will be about the same from a three-year-old pond, but then an occasional three-pound bass or twelve-ounce bream will add excitement to the catch.

While many ponds are built primarily for fish production, the purpose of most farm ponds is the conservation of water for livestock or irrigation. In ponds built as a source of water, fish are a secondary crop that can add food to the table and pleasure to farm life without damaging the pond for other purposes.

The three essentials of producing fish in a farm pond are building the pond, stocking it with fish, and managing it correctly once it is stocked. Good management of your farm pond includes fertilizing it, controlling the aquatic weeds, fishing it properly, and marketing or using at home the fish it produces.

There is no set size for a farm pond. A one-acre pond is big enough for the average farm. No fishpond should be smaller than a quarter-acre.

The essentials for a fishpond are a good source of water and a strong dam. In arid sections, ponds depending on run-off water from watersheds should be of a depth to maintain a supply of water the year round. Those ponds with a constant source of water, such as springs, should be at least six feet deep. To avoid winter kill of fish in Northern states, the depth of a pond should be 12 to 18 feet. Usually a pond has to be more than four feet deep to keep cattails out.

In northern regions where there are long periods of severe cold weather, fish sometimes die in shallow ponds if a blanket of snow covers the frozen surface. Death, however, is not usually caused by low temperature. The fish suffocate. The underwater plants through photosynthesis are the source of oxygen for fish in the pond. When a layer of snow persists over an icy pond surface, light is cut off from the plants and photosynthesis ceases. No oxygen is released, and the fish die. Where the ponds are deep, there is usually enough oxygen to keep the fish alive until the snow melts.

To give it strength the dam should be constructed with a 3-to-1 slope on the water side and a 2-to-1 slope on the opposite. A clay core is a must to prevent water from seeping out and making a puddle of your pond.

Bushes and trees should be removed from the site of the new dam and the land to be flooded. When a survey indicates that the pond will have a great deal of water less than one foot in depth, the proposed water level should be raised or lowered by altering the height of the dam.

THIS MINNOW is the size used to stock a pond. Some southern states require the stocking of minnows to control mosquitos. A good combination for stocking a one acre pond is 1000 bluegill and 100 largemouth bass to control the bluegill.

**A FARM POND is as good as the dam that holds it. A one or two acre pond like this one can be constructed with heavy machinery in a couple of days for about $300.00. The pond should be located so it will collect runoff water from five to 10 acres of pasture but not more than 12 acres if the spillway is made of earth. The Soil Conservation Service will survey the water line and the location of the dam and mark it with stakes for the machine operator to follow. Soil scraped from the bottom of the pond is used for the dam. When construction is complete the banks are seeded and the spillway is sodded with a soil binding grass. The pond is fenced and a pipe which was placed beneath the dam carries water to stock watering tanks.**

or by digging the pond deeper at the shoreline. Shallow water makes it difficult to control weeds and mosquitos.

A pipe should be installed so that the pond may be drained. A spillway will handle the overflow. To protect the faces of the dam, sod it with Bermuda or centipede grass. It may be necessary to build diversion ditches on the fields above the pond to divert flood waters and help protect the pond from silting up and becoming a mud hole.

A horse-drawn slip scoop can be used to build a pond. Many farmers, however, are employing contractors with heavy scrapers and bulldozers for this work. With the use of such modern machinery, dams can be constructed for small ponds of one-half to one and a half acres at a cost of $150 to $300. The farmer can obtain aid in planning and building a pond from his county agent, the nearby vocational agriculture teacher, or a soil conservation specialist.

The present rash of pond building has resulted from the findings of fish research men. They have learned how to grow bigger fish in small ponds. We know now that an acre of freshwater will produce human food on a par with an acre of cultivated land. For example, where an acre-pond has produced 400 to 500 pounds of fish annually, food crops grown on one acre of land will produce 500 pounds of pork or 200 pounds of beef in a period of one year.

This increase in freshwater fish production is news in this country. Europeans, particularly the Germans, have for years used sewage and grain foods for feeding fish to obtain greater yields. The sewage disposal plant of the Speicher See in Bavaria is said to have produced up to 800 pounds of fish to the acre in one year.

All these foreign experiments have been carried out with carp, which, though considered an important meat fish in other nations, doesn't appeal to the American palate.

The Alabama Agricultural Experiment Station is the pioneer in experimental work to determine how to increase pro-

duction of fish in a farm pond at a reasonable cost. In ponds which once produced 40 to 200 pounds of fish to the acre each year, the yield has been tremendously increased. In Alabama they learned that a bass that required two to three years to reach a weight of one pound in unmanaged waters, can now gain that much in one year where the pond is managed properly.

There is a story behind this research. Lake Auburn, owned by faculty members of the Alabama Polytechnic Institute, was to be stocked, yet no one knew how to do it best. There were no authoritative recommendations on record. Dean M. J. Funchess, director of the Station, asked for an appropriation to carry on experimental fish work. He then appointed H. S. Swingle, fish culturist, and Dr. E. V. Smith, botanist, to spend their time in fishpond research.

In 1934 they started out with 20 experimental ponds. They had no reference material on which to base their experiments — only initiative and perseverance. It was a proposition of trial-and-error. It was tedious because experiments with living things take months, and even years.

### Fertilizing for Fish

Uppermost in their minds was a question: "If fertilizer increases yields of crops, and hence livestock food, wouldn't it do as much for fish?"

They began to use different fertilizer combinations in ponds. Some proved to be worthless, others too costly. They tried various combinations of fish, often with disheartening results. They removed weeds from some ponds and planted weeds in others to see what effect these would have on fish populations and on the supply of oxygen added to the water.

Finally in 1938 these two scientists listed their results and found they had made startling progress in spite of their mistakes and failures. Within four years' time, they had accomplished more towards ferreting out fish facts than has been done in all the years of theorizing since the days of Izaak Walton.

Their findings and recommendations, first published ten years ago, were briefly as follows:

1. Best growth and size of fish depends on the number of fingerlings stocked initially in a pond.
2. Two species of fish must be present. One must be a predacious type, such as the bass, so that small fish will not overpopulate the pond.
3. Commercial fertilizer will triple and even quadruple the growth of fish in a pond.
4. Weeds are a nuisance in any pond in which fish are to be stocked.

These discoveries added impetus to fish pond projects in several states. Ten years ago Alabama had 1,000 farm ponds. Now there are over 5,000.

Frank C. Edminister, chief, Regional Biology, Division, Soil Conservation Serv-

**COMBINATIONS OF FISH SUITABLE FOR STOCKING ONE ACRE OF POND WATER**

| Species | Number of Each in Unfertilized Water[a] | Number of Each in Water to be Fertilized[a] | Time of Stocking | Remarks |
|---|---|---|---|---|
| A. Bluegill bream **Lepomis macrochirus** | 400 (Not more than 500) | 1,000 | Placed in pond in late summer, fall, or winter. | This combination and rates of stocking are recommendations for all localities and are considered the best for all practical purposes. |
| Largemouth black bass **Huro salmoides** | 30 (Not more than 50) | 100 | Placed in the pond the same fall or winter or as fry the following spring. | |
| B. Bluegill bream | 300 | 1,000 | Same as A | This combination is applicable to the South only. |
| Largemouth black bass | 30 | 100 | Same as A | |
| Shellcracker **Lelophus microlophus** | 100 | 500 | Added at the same time as the bluegills. | |
| C. Bluegill bream | 400 | 1,500 | Same as A | The crappie is considered a poor game fish in regard to fighting qualities. The meat is soft. Crappies compete with bass for the same food, and need deep water. |
| Largemouth black bass | 20 | 75 | Same as A | |
| White crappie **Pomoxis annularis** | 10 | 25 | Placed in the pond with bass. | |
| D. Bluegill bream | 400 | 1,200 | Same as A | Only two species of catfish have been found suitable: The yellow bullhead **Ameiurus natalis** and the speckled catfish **Ameiurus nebulosus marmoratus**. Bullheads will eventually disappear from a well managed pond. If the stream supplying water to the pond is known to be populated with catfish, it is not necessary to stock them. |
| Largemouth black bass | 20 | 100 | Same as A | |
| Bullhead catfish | 100 | 75 | Placed in the pond in the fall or as fry in the following spring. | |

The figures in the chart above all refer to fingerling sized fish, which are young fish greater than one inch in length. State laws in the Southeast require that Gambusia, or top minnows, be stocked in farm ponds along with game fish. These minnows eat mosquito larvae. One of the most frequent causes of failure in stocking a pond is over stocking. For detailed recommendations for his particular state the farmer should check with his state conservation department. Shellcracker, crappie or catfish fingerlings may be difficult to obtain from a government hatchery. These species are often hard to manage in the farm pond but when desired can usually be purchased from private hatcheries. Stocking bluegill without bass will soon over-run the pond with small fish for one pair of bluegill can have up to 20,000 young in one year. These youngsters keep the bass population down by eating the eggs. Stock them together Autumn is the best time. Wild fish in a pond can upset the stocking program.

A FARM POND is a vacation spot right on the home place where the entire family can have a choice of fishing, boating, swimming or just loafing in the sun. The pond also serves as another step in the conservation of soil and water.

ice, Darby, Penn., states that 1,423 ponds have been built in the 12 northeastern states under the supervision of his department.

The State Soil Conservation Committee in West Virginia prints a bulletin on farm ponds. Tennessee Extension specialists publish a similar booklet. Another is Circular 276 issued by the Extension Service at Clemson Agricultural College, South Carolina. Michigan State College and the West Virginia Agricultural Experiment Station are beginning fishpond management and fertilization experiments.

### How Many Fish Per Acre

In planning a new pond, the area to be covered with water should be measured since recommendations for the number of fish required is determined on an acre-basis. An acre of water will support a limited weight of fish. If too many small fish are put into a pond they will be approximately the same size three years later, but if stocking is properly done the fish can grow to eating size. In one experimental pond overstocked with 6,500 bluegill fingerlings, the average weight of each fish three years later was .9 ounces. In another pond which had the number of fish reduced to 3,200, the average weight of each fish was 1.8 ounces. A third pond with the number of fingerlings reduced to 1,300 an acre produced fish averaging 3.7 ounces each.

### Planting the Fish

A combination of species of fish in a pond is necessary for growing larger fish. In one experiment where bluegills only were stocked, growth a year later was only 2.5 ounces. At the end of the year spawning occurred and each pair of bream was blessed with an average of 4,000 young. When the pond was drained five months later, the original bluegills had lost one-third of their weight recorded before spawning. This loss was due to overcrowding.

To prevent concentration of numbers and therefore promote best growth, Swingle and Smith found that a combination of bass and bluegill fingerlings was best. Where they were used in correct proportions, bluegills gained an average weight of 3.7 ounces within a period of eight months. The bass ate many of the bream, especially those spawned in the pond. The bass grew larger, and the bluegills, reduced in number, had more food and added weight.

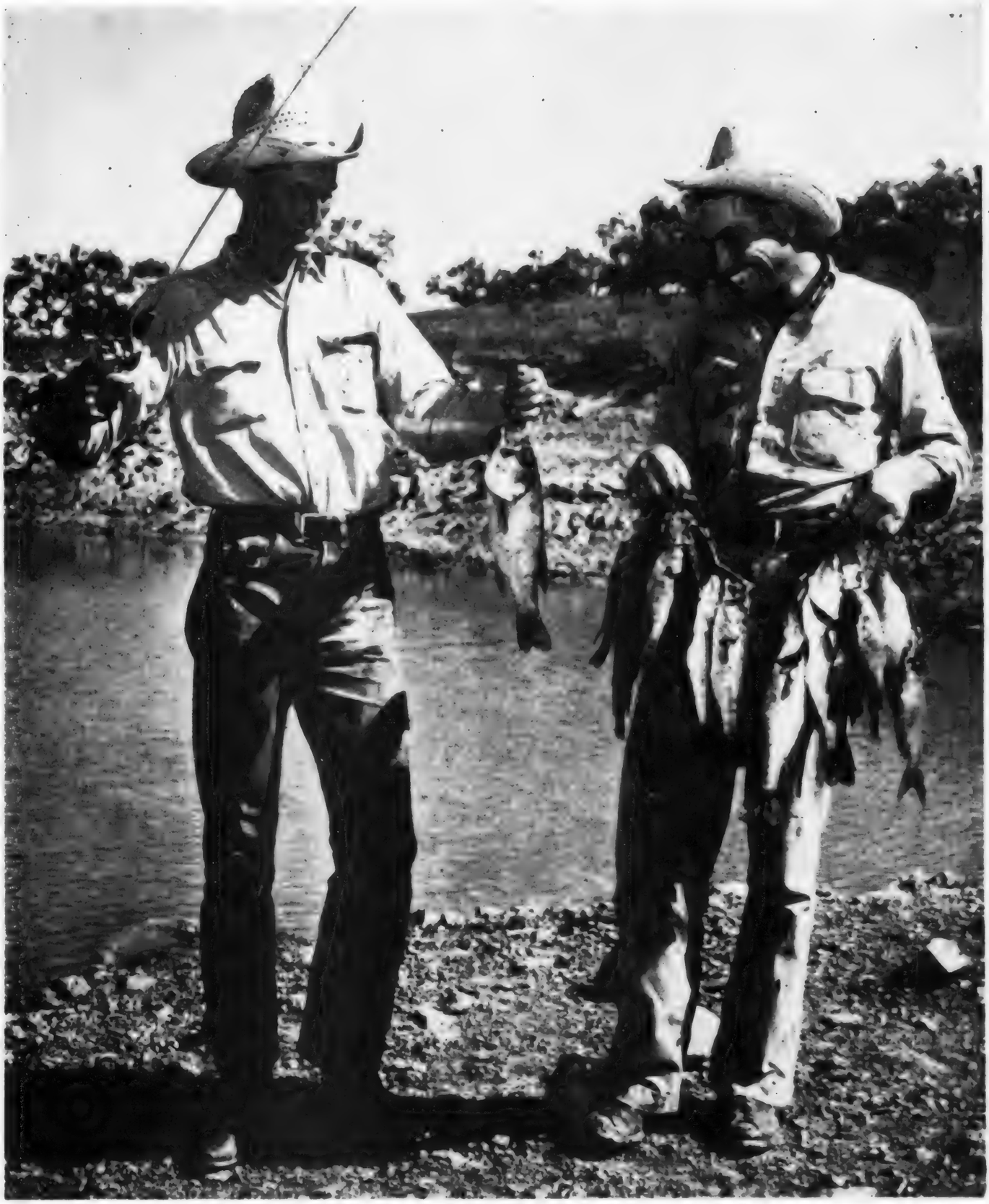
Where ponds are to be regularly fertilized, the U. S. Fish and Wildlife Service recommends 1,000 bluegill and 100 largemouth bass per acre. This ratio is satisfactory in practically any pond suitable for growing fish. In the South, Swingle recommends 1,500 bluegills to 100 bass. This higher rate is possible because of the greater productivity of southern ponds. In ponds which are not to be fertilized regularly because of prohibitive costs or because of continual muddiness, the rates for stocking are not more than 500 bluegills to 50 bass for each acre. Good results have been obtained with 400 bluegills to 30 bass in each acre of unfertilized water. In unfertilized ponds properly stocked, the growth of individual fish will be about the same as the growth of fish in fertilized water.

Fish should be carefully counted when they are stocked. This may be done with a small dipper as the fish are taken from the can in which they are shipped.

Bluegill fingerlings may be placed in the pond in the summer, fall, or winter and bass, the same fall or winter. If the bass are to be introduced the following spring, fry should be used. Fry are newly hatched fish, while fingerlings are young fish more than one inch long. According to the Fish and Wildlife Service, both species of fish may be stocked at the same time, but the fish should be as uniform in size as possible. Stocking adult fish is not a good idea. Fingerling fish may be obtained through

(Continued on page 136)

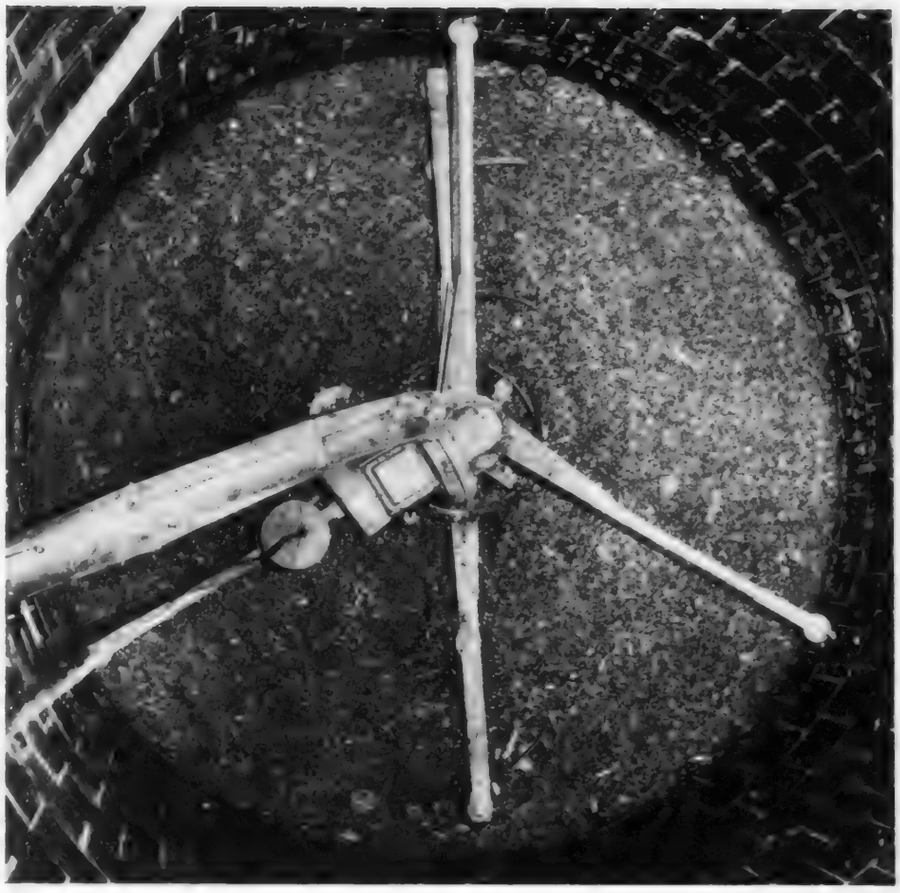
**THESE FELLOWS feed at the same table. Neither trout like these ready for a mountain stream nor bluegill in a farm pond will grow large when fish food is scarce or there are too many fish to share it.**



ONE REASON the hands like to work on the Dunmon Ranch in Colman County, Texas, is because they can spend their spare time catching strings of fish like these. The lake that housed these bluegill and bass covers 48 acres and is fertilized to produce a maximum of fish. None of these fish are more than 18 months old. The bass weigh an average of one and one quarter pounds; the bluegill average from one quarter to three quarters of a pound. This sized pond would be a giant in the Midwest but is fairly common on the large ranches of Texas.

SILO FILLING on the Conner Prairie Farm operates with a production line efficiency. A fleet of metal wagons keeps both the Fox River field harvester and blower in constant operation. The wagons, which have a capacity up to four tons, were designed on the farm and built in Windfall, Indiana. They cost $1,500 each, but Bubenzer believes they could be made for $1,000 on a production basis. The endgate and the conveyor are controlled from the tractor seat. The one agitator, hidden under the silage, is given a hand to prevent packing. Farm mechanics plan to install a second to eliminate the hand work.

A SILO UNLOADER saves two time-consuming climbing jobs a day. The revolving arms feed the silage into the blower at the center which carries it to the chute. It is controlled by a switch in the milking parlor.



# Push Button Farm

A SWEATING, dusty workman was up to his belt in the elevator chute of the silage chopper, trying to pry it back on the track.

"Throw me up that screwdriver, please," he shouted down to the tractor operator, who was on the ground below. The tool came up, handle first. "Thanks," said the man on the chute, as he ducked into it to put the screw-driver to work.

He was hot and dirty and mad, and the silage wasn't getting in, but he didn't forget his manners. The work on the Conner Prarie Farm gets done because everyone has a stake in getting in the silage, harvesting the wheat, planting the corn, and finishing the steers.

The twelve men who turn out 22.000 bushels of corn, 8,000 bushels of oats, 3,000 bushels of wheat, 300 steers, 1,000 hogs, and 10,000 gallons of milk each year on the Connor Prairie Farm work together. The incentive is a share in the profits, a feeling of security, better than average living conditions, and a boss who habitually wears overalls and can put out as good a day's work as any of them.

There's been a good deal of talk lately about the trend toward big farming units —the big ones are getting bigger and the little ones are being gobbled up and the small owners are moving off. Rural sociologists say this is bad, because big units don't ordinarily produce as much as the same amount of land in small farms; they rarely shows a profit, and the farm worker loses his pride of ownership.

Until a few years ago the Conner Prairie Farm, near Noblesville, Indiana, had been a Sunday farm, an outlet for some of the profits from one of the great drug businesses of the country. Its owner, Eli Lilly, accumulated yards of blue ribbons on his Scotch Shorthorns, his Berkshire hogs, and his Percheron horses, while the farm showed a tremendous loss each year.

In 1942 his manager died. He could have turned the farm over to a management service, as many owners of big farms do, with an expectation of making a profit. He preferred, however, to offer the job to Tillman Bubenzer, who had farmed one of his outlying farms for a number of years with outstanding success. Bubenzer is a German-born emigrant who had come to America with empty pockets in 1928 to make his fortune. He is a graduate of one of Germany's great agricultural schools and had managed farms in his native land. He brought with him German thoroughness, a love of the soil, and a constitutional dislike for waste and inefficiency. What is more, he believed that taking profits out of a large farming operation depends as much on satisfied

**THE WHITEFACES line up along the pasture fence for their ration of supplement. The long feed bunk is filled from the road. A farm-designed wagon, with a conveyor which extends from the wagon across the berm to the bunk, saves time and the inconvenience of driving into the field among the cattle.**

workers as on fertilizer formulas and crop rotations.

He accepted the job of managing the 1200 acres of Conner Prairie on the condition that he would have a free hand in reorganizing the entire set-up. He told Mr. Lilly, "I don't want to have anything to do with a farm that won't pay its own way." He was given the green light. Bubenzer hoped to lay an old ghost that has stalked American barnyards for a long time—that the family farm is a more efficient and productive unit than the large operation. He agreed that on a small farm blessed with a husky son or two, the out-of-pocket labor costs are usually small and the farmer rarely thinks of paying himself time and a half for overtime. "A large operation," he says, "using machinery at its maximum, with specialists in every department, should have the advantages that mass production has over hand work." This he set out to prove. With his pretty Irish wife he moved into the manager's house at Conner Prairie.

His next move was to call all the boys on the farm together. Then he made a little speech.

"Up to now this has been a show farm," he said, "the aim being to get as many blue ribbons as possible. From now on it's going to make money, for no good farmer can run a farm on a deficit very long. I can't do that myself—only with your help can it be done. If we make money you will get a share of it. I am convinced that a farm of this size should make a definite contribution to agriculture; from now on our goal will be to develop breeding stock in our livestock departments and crops in our fields to sell as seed and to feed as grain. We need the help and cooperation of every man on the farm. Anyone helping me to attain this goal will be my friend. Anyone not interested had better leave now."

Bubenzer had a four-point program for bringing Conner Prairie out of the red. He had managed a 1000-acre farm in Germany and he knew some of the ways profits can leak away on a big farm. His first and most important point was to obtain competent help and to offer them conditions that would keep them happy and efficient; his second was to set up a bookkeeping system that would tell him, at any given time, what each field, cow or hog was contributing; his third was to replace hand labor by mechanization; and his fourth was to build up the soil to higher production.

### The Help

The first move was to find competent help. Bubenzer salvaged the good men from the origional crew, and carefully filled the vacancies until he has his present outfit which he believes to be one of the most efficient farm production teams in the country. There are sixteen of them, manager, secretary, five field men, six stock men, and a maintenance crew of three. They have reasonable security, and they are well paid.

The typical worker on the Conner Prairie Farm receives $65.00 a month as a base pay and adds to this in a number of ways designed to pay him a premium on his ability and efficiency. He is furnished a house and garden plot. The tenant houses on the Conner Prairie Farm are attractive country homes and are kept in repair at the expense of the owner. The average family consumption of electricity is allowed to each home.

Each man receives up to a gallon and a half of Grade A milk delivered at his doorstep each morning. Those who keep chickens receive free 270 pounds of feed each month, enough for three dozen laying hens; if they keep no chickens, they get the money equivalent. Each family receives free, dresed and delivered, a 225 pound hog every year. Regardless of whether or not the Farm makes a profit, they receive a full month's pay as a Christmas gift and each man gets two week's vacation with full pay.

In addition to the base pay, which is paid on the fifteenth of the month, each man receives a "hard time bonus" the

**THE BUTTERMILK SPECIAL delivers semi-solid to the hog feeders. The wagon was made from a surplus tank and a gasoline pump hose. The tubs are graduated to measure the amount for each pen. Supplement is shoveled from a bin on the rear end of the truck. These are Minnesota hogs.**

first of the month. The base pay has not been changed since 1942. The "hard time bonus" works in reverse during hard times. Based on the cost of living index, it goes up and down with living costs and is as sensitive as the housewive's purse to current price trends. At one time it was as low as $5.00 a month; it is now about $40.00. Bubenzer says that he has a simple method of determining when to raise it; "When I get more than the usual number of requests for loans 'until pay day' I know we should look into the hard time bonus," he says. "All the boys here are pretty good managers and if they can't make their wages stretch I know they're not getting enough."

The farm is divided into five departments: (1) Hogs, (2) Dairy, (3) Beef Cattle, (4) Fields, (5) Feed and Grain. Accurate records are kept in each department. The men in charge of the hogs receive a set amount for each hog sold, or 10 per cent of the net profits, whichever is the higher; the men in the beef cattle department receive a similar bonus.

In the dairy the men get a percentage of the milk check as well as 10 per cent of the net profit. The reason that the livestock men have a chance to earn more than 10 per cent is that they cannot make any overtime as paid the men in the field department who work from 6:30 A.M. to 5:30 P.M. with an hour off for lunch, 5½ days a week. All over those hours are counted as overtime for which the men receive 85c an hour in addition to sharing 10 per cent of the net profit of their department. From December 1 to March 1

**STABLES AND HOG BARNS of the "across-the-river" unit of the Conner Prairie Farm where formerly only purebred stock was kept. The stables have been converted into cattle feeding units. The hog barns are at lower right. Upper left are the hog lots each with its portable house. The big tower is a corn crib. Note the guard fences around the trees.**

the day is cut to eight hours at the same wage. The profit sharing bonus is figured on gross sales less labor, supplies, feed, registration, veterinary, advertising, repairs and depreciation of equipment, taxes and incidentals. A systematic set of books is kept on each department. Each man knows what his department accomplishes and naturally is interested in its success. The field boys get credit for their crops at prices prevailing at local elevators at harvest time. The hay, straw and ensilage are charged direct to the different livestock departments. The same applies to commercial feeds. All grains raised on the farm are charged to the elevator and later when fed charged to the livestock departments, where a charge for handling is added.

The system was not born like Minerva, full grown and lusty. "It staggered around for a good while until we took the bugs out of it," Bubenzer said. "For instance, the livestock men went to the elevator, weighed and ground their own feed, and hauled it to their barns. The elevator was a mess—litter scattered around, feed and time wasted, and a general disorder. We changed that two years ago. We put a man in there and he grinds, mixes and weighs all the feed and delivers it each morning to the various barns. The elevator account receives five cents per 100 pounds to cover the cost of handling. This department is strictly a center for inter-farm transfers. The charge is not fixed and if the price is found to more than cover the elevator expense, it is lowered the following year.

"When we hire a man we try to find out what he can do best," said Bubenzer. "I ask him, 'What do you like to do? We'll pay you more if you earn more. Be sure you pick something you like for we specialize and you'll be doing a lot of whatever is assigned to you'."

Every year there's a big party. Plenty of good food, a picture show, prizes, and drinks. "The men get to know each other pretty quickly, working together every day," says Bubenzer. "The women get acquainted at the party. They all dress up and have a good talk and from then on they're neighbors."

In summing up his personnel problems, Bubenzer said, "We believe that most important to profits is the welfare of the men who do the actual work on Conner Prairie Farm. We cooperate with them to provide good living conditions; they know they have a job as long as they want to work, and can educate their children and bank some savings. If they want to start for themselves we give help to them.

"Before we started the profit sharing system here I often rode down a corn row after the cultivator and counted hundreds of half-covered plants. Now I don't have to worry. The boys know that every corn stalk covered is taking money out of their pockets too."

### Push Button Farming

The boys at Conner Prairie literally have more callouses on their backsides than they have on their hands. Machines have reduced hand labor to a minimum. When machinery can do a piece of work better or quicker, it is purchased or whipped up in the farm shop.

Bob Davis, who once handled the Per-

**TILLMAN BUBENZER and his board of strategy, foremen of field, dairy, hog and beef cattle departments, hold an early morning meeting to map the work for the day. Behind Bubenzer is a map of Conner Prairie fields showing the 30 soil types on the farm.**

cherons on the Farm, grows lyrical when he talks of the machines that do the work. "We can have any machine we want," he says. "If anybody around here wants to get out of hard work, he just invents a machine to do it for him."

Filling the silos was once a back-breaking job. Now hundreds of tons are put up and no human hand touches the silage from the field to the silo. The work is no more strenuous than pulling levers, pressing a button, or steering a tractor. Three specially made wagons designed on the farm and built by Bollinger Bros., Windfall, Ind., twenty-one feet long and with a capacity up to four tons, bring the silage from the fields. It is chopped in the field and loaded by a Fox River field harvester. The wagons are driven up to the blower, the tail gate is raised hydraulically, and an endless drag chain powered by the truck motor carries the load into the blower. The only hand labor is clearing up around the blower after the job is done. On a good day 100 tons of silage can be put up with a crew of six men. A four ton load can be unloaded in seven minutes.

In the two elevators on the farm, corn is shelled without having to handle it, the grain going to one overhead bin, the cobs to another. Oats and rye go to other bins and the job of mixing, grinding and loading feed is no more complicated than

THE GUTTERS behind 42 stanchions are cleaned in twenty minutes by a Crown endless chain type cleaner. The manure falls into a pit and from there is carried out of the barn by elevator and dumped into a spreader. It goes on the field daily. The fan keeps fresh air moving, discourages flies and lowers summer temperatures. The cleaner is dismantled in summer and stored in oil.

pulling a series of ropes to open various bins and turning on a motor to run the hammermill.

To distribute the ground mixed feed and shelled corn to the livestock departments a wagon equipped with an auger feed unloader built by Piper-Odell Company, Princeton, Illinois, is used and shoveling of food is completely eliminated, since this wagon is able to auger the feed into the self-feeders or into the feed bins in the barns.

The dairy barn is equipped with a Crown Barn Cleaner, manufactured in Wausau, Wisconsin. And endless drag chain and paddle arrangement carries the manure and bedding to a pit from which an elevator carries it out to the barn and dumps it into a spreader. This whole operation requires twenty minutes to clean a barn of 42 stanchions. This barn cleaner is used only in the wintertime when the cows are in the barn and bedded. In the summertime the chain is taken out and stored in oil. During this season of the year the cows are only in the barn long enough to be milked and the stanchions and gutters are kept clean with a high pressure hose.

Leach Silo Unloaders have been installed in the two silos at the dairy barn, eliminating the twice a day chore of climbing the silo. This machine, manufactured by Leach Company, Oshkosh, Wisconsin, enables two men to handle the dairy herd the year around. By using two of these unloaders the cows can be fed alfalfa ensilage in the morning and corn ensilage in the evening.

To make repairs on all this mechanical equipment there is a fully equipped shop. Every man in the field department is a mechanic, which is almost as important at Conner Prairie as being a good farmer. They all have their own small tools and when a breakdown occurs the whole gang flies into action. There is an electric welder and a cutting torch on the farm as well as a lot of fancy electric saws and drills.

"You would think," said Ed Fisher, the foreman, "that it would be simple to make a hitch to run these discs behind a tractor. Before we got through with one that wouldn't upset the inside disc on a turn we had an involved problem that included higher mathemtics and physics." This big triple-disc hitch enables one driver to cover 100 acres a day when time means failure or success of a corn crop.

Tourists driving along the north side of the farm at feeding time morning and evening see an amazing sight, 175 head of cattle, feeding from one long feed bunk built just outside the fence along the road. The king-size feed bunk was designed to speed up to operation of feeding a large herd of steers in all weather and without interfering with the animals themselves. It was found that if the feed was taken into the fields the heavy wagon and tractor mired down in wet weather; the cattle interfered with unloading and it took a

(Continued on page 105)

**THE INCREASING USE** of grass silage and a larger livestock population on the Conner Prairie Farm required additional storage space, supplied in 1947 by a temporary silo. Silage cured perfectly but structurally it was something less than perfect. Uneven settling over the chute called for extra supports and bracing. It is made of welded wire fencing and sisal craft paper. The chute is an 18-inch jointed steel pipe. The fine Minnesota shoats have no connection with the silo; they live nearby.

ALTHOUGH Aberdeen-Angus calves may weigh on the light side in range country, they make up for it by being correspondingly heavier when raised on Midwest or Eastern pastures. These Angus are on the Edward Jenkins Farm near Millwood, Va.

# THE POLLED BLACKS

BY LLOYD D. MILLER

A CROWD of stockmen clustered around two black polled bulls. It was the Kansas City Fair and the year was 1873. Here were two animals of beef type resembling no breed the curious ranchers and farmers had ever seen. These naturally hornless black cattle were the first Aberdeen-Angus to appear in American livestock shows.

Angus cattle were late on the American scene. The beef cattle field was already well stocked and fine beef breeds were grazing profitably in pastures that stretched far onto the slopes of the Rockies. The reds, roans and whites of the Shorthorn breed made their appearance on American farms in 1783, ninety years before; Herefords trekked westward to the range country after their importation in 1817, fifty-six years earlier than the Blacks; and even the Brahmans entered the beef cattle picture in 1849, twenty-four years before the Angus.

George Grant of Victoria, Kansas, remembered that in his native Scotland there were naturally polled cattle that were reputed to mature earlier into prime beef. He was a retired silk merchant who had left England to come to the United States to live the pioneer life on the plains. Grant was living at Victoria, Kansas, in 1873 when he imported four Aberdeen-Angus bulls, two of which he exhibited at Kansas City. These were the ones that aroused the interest of American cattle men.

These bulls were crossed with native Texas cattle of the Longhorn variety. The results of this first cross were so outstanding and so materially improved the type and quality of the native cattle that they soon became popular among the feeders of beef cattle in the Southwest and Midwest. The majority of the calves from the first cross were black in color and practically all were hornless, demonstrating the prepotency of the Aberdeen-Angus blood, with its hornless characteristics.

Cattle feeders found that polled cattle were easier to handle in the feedlot than the rampaging native cattle. Losses sustained from bruises during shipping were reduced because the Angus had no horns to get tangled up in another animal's rump and sides. It was the acceptable performance of these Kansas crossbreds, and later another importation of Aberdeen-Angus made in 1878 by Anderson and Findlay, Chicago business men and natives of Scotland, which led to the extensive introduction of black cattle into the Midwest.

Back of today's Aberdeen-Angus cattle are more than 400 years of constructive breeding toward perfection in beef pro-

JAMES QUISENBERRY has made money with Angus cattle on his farm near Winchester, Kentucky. He uses a grass farming program and lets the cattle feed themselves on the blue grass and lespedeza pastures. The fine bull is Hill Crest Qualiteer.

HORNS, NOT CANNON BALLS, did the damage to these beef carcasses. This photograph, taken for the Live Stock Loss Prevention Board of Kansas City, is a good argument for the Angus breeders sales point, "You don't have losses from horn damage if the animals you raise are polled." Horn damage ruins the hides, too.

duction. Angus have been black and hornless since the dawn of recorded history. As a result, the early developers of the breed in Scotland did not have to contend with such minor points as color and markings, horn shape, or extremes in size and type. Instead, the Angus breeders have been able to concentrate on the production of a beef animal carrying a high percentage of edible product of high quality; on a quick maturing, fast gaining animal ready for market and a premium price at an age of 15 months.

Progress of Aberdeen-Angus cattle since the 16th century is one of the interesting chapters of animal husbandry. The Angus we see today stem from the hornless, black native cattle of northern Scotland. Living in a rugged country, where vegetation was not the best, these cattle by nature had to be superior foragers in order to exist. At first they were not popular outside of their own shires, for in the 1500's cattle were kept primarily for farm power; the production of beef was a secondary attribute. For many years big-boned and slow-maturing cattle were in the greatest demand.

However, about 1750 beef began to be an increasingly important meat in the British diet. Raising beef cattle became an accepted farm practice. The horsey, raw-boned cattle of the low countries were slow maturing; they were not inclined to fatten evenly, and did not produce the best beef carcasses. The trim, quick maturing black cattle of the shires of Aberdeen and Angus were found to be superior, producing prime beef more quickly. It was found also that these black cattle showed a tendency to intermingle their fat with the lean tissues, rather than depositing the bulk of the fat on the outside. It was not long until the discriminating British beef market coined the term "prime Scots" for these black, hornless bullocks from the north country and they were set up as a standard of premium quality.

There is no herd in America today that does not trace back somewhere in its pedigree to the breed builders developed by the Scotchmen Hugh Watson, William McCombie and Sir George McPherson Grant.

The fame of Aberdeen-Angus cattle as beef producers eventually spread outside the confines of Great Britain. In the Paris Exposition of 1856 and again in 1878, attention was centered on the blocky Blacks for at these shows they won championships and grand championships in competition with all other breeds of cattle. This was no surprise to the breed enthusiasts, however, for they had been winning interbreed honors for many years at the great Smithfield Fat Stock Show against the best that could be produced in Britain.

It remained for the first importation of Angus to America in 1873 to set the stage for the breed's great period of development and expansion. Unhampered by geographical limitations, or limitations of grain and forage, the Aberdeen-Angus soon proved that they had the qualities necessary to compete with the long established breeds.

### Records at the International

At the world's greatest fat stock show—the International Livestock Exposition of Chicago—more than 75 per cent of all interbreed grand championships have been won by Aberdeen-Angus since the show's beginning in 1900, twenty-seven years after the first importation of the breed.

Back of the steady advance of Angus are beef-making qualities that make them profitable. Naturally hornless, they are prepotent in crossbreeding. Mated to horned cows, Angus bulls produce calves that are 95% or more hornless, and at the same time uniform in type and color. Being black in color seems to be the factor largely responsible for the escape by Angus cattle from the dreaded toll taken by cancer eye in range herds. This factor alone has contributed to the growing acceptance of Angus by commercial producers in the West and South. The Blacks also show great resistance to pink eye and are seldom bothered with sunburned udders which encourage fly infections on the range.

Aberdeen-Angus cows are good rustlers and are known for their longevity. Carlton

Corbin of Stoneybroke Ranch, Ada, Oklahoma, likes to use this virtue in advertising the merits of his Angus herd. One of his advertisements reads: "For sale: Aged cows over 22 and not past 26. Older cows so fat they were sold on the market for heiferettes." In order to prove to his neighbors that Angus cattle will die, Corbin has mounted the skull of one of his best cows above a fireplace in his ranch home. The mounted skull has an inscription underneath which reads: "This cow died only because she was struck by a bolt of lightning."

In 1945 the Aberdeen-Angus Journal conducted an "Oldest Cow Contest" to find the aged matron of the breed. The winner was Elm Branch Blackbird 2nd, owned by H. A. Cunningham of Pollock, Missouri. The cow lacked three months of being 26 years old and was carrying her 24th calf. She already had mothered 21 heifer calves and two bulls. Winning the award for having the herd with the greatest number of matrons over ten years of age were Mr. and Mrs. Tim Pierce of West Woodlawn Farms, Creston, Illinois. They had 71 females over ten years of age.

Angus cows are good mothers providing plenty of rich milk for their young. Birth weight for Angus calves ranges from 60 to 70 pounds which makes them among the lightest of the beef breeds. This factor plus the characteristic that Angus calves have smaller heads decreases the death losses through calving on the range where heifers are unattended. Low calving losses in Angus heifers or other breeds of cattle bred to Angus bulls causes many range men to select the breed. Breeders who favor other breeds often use Angus bulls on heifers for their first crop of calves to cut down their calving losses. The smaller calves with smaller heads are responsible for the first-calving heifers dropping their calves with very little trouble.

At weaning time in the breeding herds, Angus calves usually weigh from 350 to 500 pounds. Commercial range herds usually find their calves somewhat lighter at weaning time than the smaller farm herds where pastures are more abundant and creep feeding is practiced.

William G. Davisson, of Ardmore, Oklahoma, bought 100 Angus cows 20 years ago. Since his ranch is divided into numerous fenced pastures, it was easy for him to handle two breeds, a total of 2500 head, and keep them pure. He used registered bulls for both breeds of cows every year.

"Last year our Angus calves averaged around 40 pounds heavier and brought $7.50 a head more than our other calves," says Davisson. "Considering the usual number of cutbacks in our other calf crops, the Blacks made another $7.50 a head. This total difference of approximately $15 a head is enough to convince me that Angus are more profitable.

EILEENMERE 500TH standing knee-deep in the straw that seems to go with beef cattle pictures. Owned by the J. Garrett Tolan Farms of Pleasant Plains, Ill., he has the characteristics that Angus breeders want. This bull is broad, deep, low-set, compact and smoothly covered, with straight top and bottom lines. He was Grand Champion at the 1946 International, sired the Get of Sire, and nine of his offspring were in the 1st prize group of Angus at the same show.

TWO NEATLY TRIMMED cuts of Angus meat that show the marbling characteristic. Butchers say they can spot Angus meat, and beef connoisseurs claim they can tell an Angus steak because the fat is mixed in with the lean meat. This, they say, keeps the meat moist and juicy, and tends to baste the steak during broiling.

"We find the feeders who buy from us prefer to get Angus calves," he continued, "and are willing to pay $1 to $1.50 a hundredweight more for the Blacks. We like them because they are heavier at weaning time".

Davisson ships his calves each year to the same Corn Belt feedlot—the farm of Dwight Smoker of Wanatah, Indiana. The rancher and the feeder have never met, yet their working arrangement has been highly satisfactory because the Angus cattle have made money for both of them.

### Some People Don't Like Angus

Bill Imler, Laurelville, Ohio, who has fed all breeds of cattle on his farm, has this to say about Angus cattle, "No cattle will get bug-eyed with fear any quicker than an Angus. Anything out of the ordinary will send them charging to the far end of the feed lot." Summing up the usual objections that people have to Angus

(Continued on page 101)

THE WRONG THING to do about a swelling on horse's withers. Home-spun operations can spread brucella abortus germs.

# *FISTULAS ARE DYNAMITE*

BY FRANK P. TODD, D.V.M.

JOHN TUCKER, the farmer holding the knife menacingly in the photograph above, is a native of West Virginia. Like many farmers his ideas on fistulas are based mostly on his own experiences and those of his neighbors. It is a credit to this mare's intelligence that she feared the knife worse than the fistula; she became unmanageable, which prevented the homespun operation. After getting the mare back into a pasture field, Tucker said wearily, "Fella I knew up toward Bluefield who could charm a fistula away; I don't know his name, but he would be worth hunting up. He never touched a horse, just walked past the place where she had a fistula saying something to himself and then he would stop and look at her. In a few days the danged thing would be gone."

J. B. Motley, a Pennsylvania farmer, has other remedies. He said, "There's a good medicine advertised in one of the farm papers. You rub it on like liniment, and they say it will cause the swelling to go down. Fistulas come from the horse rubbing herself on the knot of a wild cherry tree."

A teamster down in Ripley, Ohio, says he cuts 'em open, lets the pus drain out. Then he packs the hole full of ground glass. "They are hard to get rid of generally. It's something like a cancer in humans, I guess," he says.

Strange beliefs about remedies for fistulas crop up everywhere. In 1947 a well-known national horse magazine in its question and answer column conducted by its veterinary editor printed this answer to a reader's question as to what treatment he could give a pony mare with fistula of the withers:

"Treat with a preparation of arsenic, willow bark and other ingredients which are mixed with the feed night and morning for several months. (Write for this formula.) No other treatment should be used for the fistula except to oil the area below it in order to protect the skin."

Odd bodkins information on the subject of fistulas is a potential source of danger to farm animals and, through contamination, to humans.

Just to be sure that the lack of accurate information on fistulas was not a localized condition the heads of 18 Veterinary Science Departments in Agriculture Schools, State Livestock Sanitary Departments and

Government Research Centers were contacted. They were unanimous in their opinions that farmers didn't know the danger of spreading brucellosis to their cattle from a horse that had an open fistula. Dr. A. J. Durant, Chairman of the Department of Veterinary Science at the University of Missouri, says, "Farmers generally do not worry about their personal dangers in opening fistulas for drainage."

The fistula, which is an open, draining bursa (swelling) on horses' withers (shoulders) or poll (head), might easily pass as a horse-size boil or a nasty inflammation. Fistula of the withers is a term loosely applied to any chronic, deep-seated inflammation in the region of the withers, overlying the second and third thoracic spines. Poll evil is a similar condition which affects the poll instead of the withers. Research men are not agreed about the cause of fistulas; the important thing to the farmer and livestock man is that veterinarians and scientists do regard them as latently dangerous because of the possibility that the discharge, when the fistula breaks or is cut open, may contain viable germs of *brucella abortus* or Bang's disease, which may be passed on to cattle, other horses, or man.

Dr. I. Forest Huddleson of Michigan State College points out, "It has been shown by Lavine of Cornell, Fitch of Minnesota, and Van der Hoeden of Holland that most cases of fistula and poll evil in horses are associated with the brucella organism. I do not think anyone knows for sure whether the primary cause of these two conditions is due to brucella. There is no question that a horse with an open fistula, is a menace to other livestock and very dangerous for farmers to handle. There have been two outbreaks of brucellosis locally in herds of dairy cattle that were associating with infected horses."

### The Bug That Causes It

Brucellosis is the correct name for the disease which affects cattle, sheep, hogs and man, caused by similar strains of virus. We hear of it also as Bang's disease, Malta fever, and undulant fever. *Brucella abortus* (the disease of cattle) can infect cattle, goats, horses and men. *Brucella suis* (the disease of swine) can infect hogs, cattle and men. *Brucella melitensis* (the disease of sheep) can infect sheep, goats, and men. As these listings show, a man can get any of the various strains under certain conditions. The virus enters easiest through open cuts and wounds or if swallowed on food. The symptoms of the disease in a horse are the fistula or swelling of the withers or poll; they rarely abort. Hogs, sheep, cattle and goats abort. In humans, the disease is exceedingly difficult to diagnose. Writing in the *American Medical Association News,* Dr. Harold J. Harris, M.D. of New York said, "Brucellosis, also known as undulant fever, is a difficult disease to diagnose because psychoneurosis (nervous disorders) mask the original symptoms."

### What To Do About It

If a farmer has a horse with a fistula or other animals which he suspects of brucellosis there is only one safe thing to do. Call a veterinarian, ask him to take a blood sample from the animal and have a laboratory check made on it. In any case keep the animal isolated. Wear overshoes, which can be removed and left in the same pen, and avoid getting any discharge from open fistula sores of a horse or the vaginal discharge from the other animals on the hands or clothes. It may be carried to the membranes of the eye of another animal, which is an effective method of spreading the disease. Or it may be carried to another animal's food. The one thing to be sure of with a horse is not to allow the swelling to be cut open. The bursa, or swelling does not often open spontaneously and there is usually plenty of time to have the horse examined and tested by a veterinarian.

### A Good Horse Can Be Saved

Depending on the value of the horse, either actual or sentimental, the owner will have to make his decision on whether or not to operate and remove the diseased tissue. Of course, horses may be worked and ridden with fistulas but they are often nervous and irritable, and there is always the danger that the swelling may be opened by the horse rubbing against a tree or a

(Continued on page 104)

THIS HORSE has a fistula discharging dangerous brucella abortus germs, which might infect cattle with Bang's disease. She is being given chloral hydrate, an anesthetic used for horses.

TWO INCISIONS are used to open the withers, so that the diseased tendon can be removed. After the operation the wound will be kept open for about four weeks to allow drainage. Approximately 88% of such operations have proven successful, according to figures tabulated by the Veterinary Department at Ohio State University. The operation does not damage a horse's gaits.

CHEMICAL TESTS made on parts of corn plants show that the oxygen supply to roots often determines how well fertilizer is utilized. The growth processes in the roots use oxygen as well as the soil bacteria, factors in the utilization of fertilizer.

# GIVE IT AIR

THERE are two ways to increase the size of your farm: (1) buy more acres, (2) use more of what you already have. The first method is obvious and farmers have been operating on that basis ever since farming became a way of life. It is often difficult to lay by enough money to buy more fields and not all farmers have been able to do it.

The second method is relatively simple and highly possible, and it's not expensive. Most farmers regard the so-called top-soil on their fields as their working capital. If it's thin they accept small crops as inevitable; if it is deep and fertile they consider themselves lucky.

One way to increase the size of a farm without buying more land is to use more of the ground underneath the topsoil. The productive power of the subsoil increases when it is ventilated and roots can carry organic matter down to it. All soils need more air.

Just recently the men whose business it is to help the farmer have been working on new ways to get air into the soil. While the farmer has been busy doing the chores and planting and harvesting his crops, these people have been working in their test plots and laboratories and trying out their theories about soil improvement. They have taken their discoveries to the fields of ordinary dirt farmers and tested them under the conditions which every farmer understands.

The agronomists say that soil needs more air than it has been getting under the American methods of farming. This not only applies to the top soil where the roots of plants grow heaviest and where they get the bulk of their food, but the subsoil, where they send their deeper roots. They

have found that if both the topsoil and the subsoil were better drained and given more air, crops would grow better and there would be a bigger cash return from the same acreage. If organic matter or humus can be injected into the subsoil, it becomes productive.

Before we investigate methods of ventilating the soil, let's make a roundup of the reasons why soil needs air. This will be quite a tour, so if you would rather take our word for it and go on to how to get it done, then skip about six minutes reading and jump to "How to Ventilate the Subsoil." We'll join you there.

### Why the Subsoil Needs Air

If the topsoil and the subsoil are dense and hard, neither soil air nor water with absorbed oxygen have that freedom of movement so necessary to plant growth. Plant roots need both oxygen and water, but they are choosey about the way they are supplied and the proportion of one to the other.

One of the principal reasons for breaking hard formations in our land is to allow moisture to enter easily and quickly so that plant roots will be able to get a drink during dry weather.

When rain falls upon land it passes downward through the air spaces, assisted by gravity, until it finds an obstruction which causes it to stand in the lower air spaces or until it all becomes capillary water. Capillary water is the water which clings to organic matter and to each soil grain and remains until it is taken off by roots or by evaporation.

If a soil structure is loose, or "free," all the way down, all the water falling upon it will seep downward until it all becomes capillary water, for each soil grain will "hold back" its own portion in a fixed position. This water will cling to the soil grain until a portion near at hand is exhausted. Capillary water will then move toward that depleted portion, but it moves so slowly in most soil types that its movement is of no value to a root system.

In average loam soil, in six weeks' time, capillary water will move downward only seven inches, while it will move upward only four inches and sidewise only five inches. It's as plain as the nose on your face that we must have soil in such physical condition that roots can grow to a new supply of soil solution rather than wait for it to travel to them by capillary movement. Mahomet must go to the mountain.

If we divide soils into three general classes, clay, sand, and loam, we will find that about one-third of a clay soil consists of air spaces, a little less than half of sandy soil consists of air spaces, and quite a little more than half of a loam soil consists of air spaces. Consequently, loam soils will receive and hold considerably more moisture than the clay types which take in water very slowly and which evaporate or lose their water very slowly. This is one of the reasons our loam soils are usually most productive. They are more sensitive to delicate moisture balances.

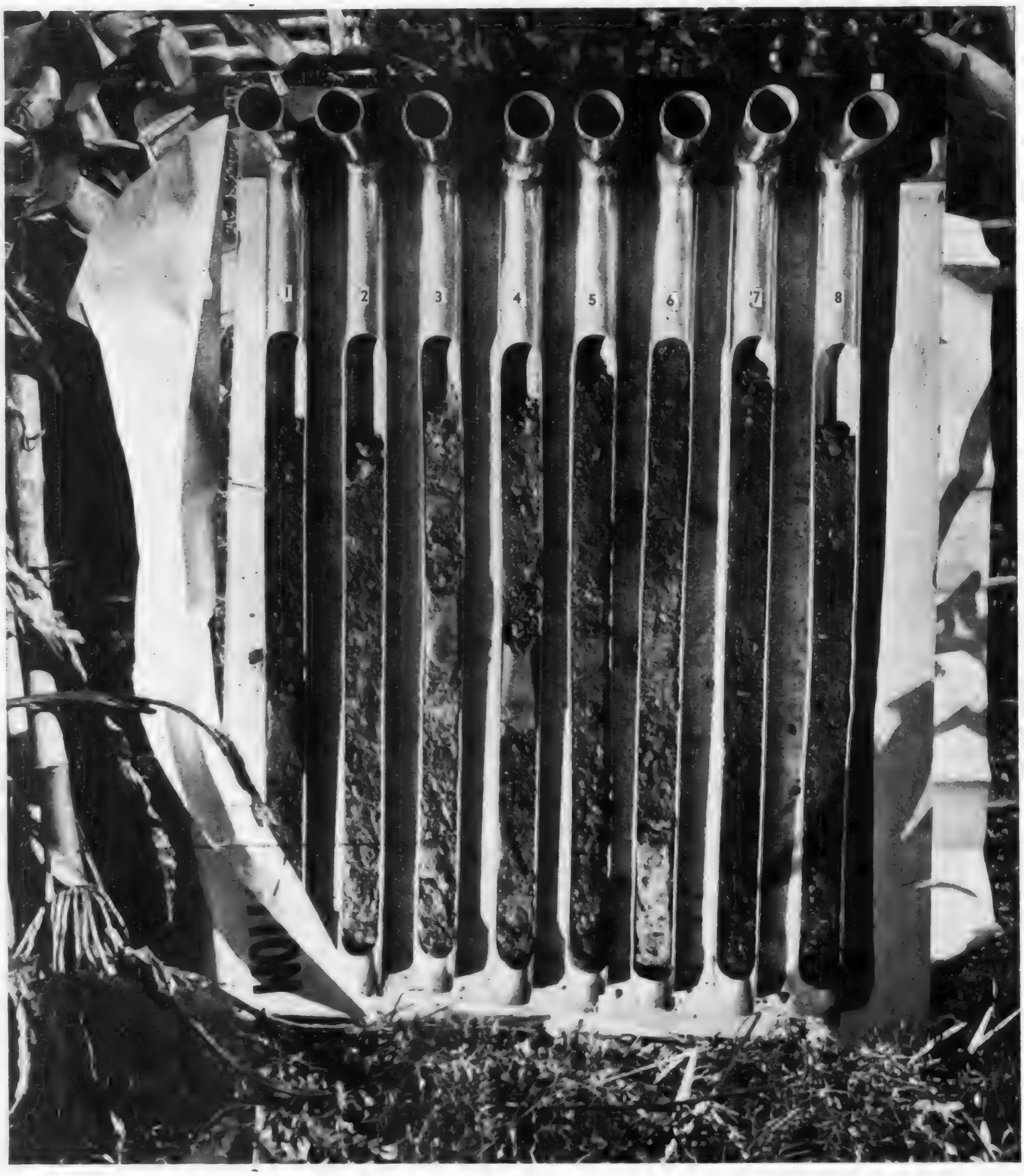
Suppose we build a square concrete box six inches deep with a tight bottom. We will leave the top open and fill the box level full of average loam soil. If we then place it in the open to catch rain water, we will find that less than two inches of water will flood the box. Air spaces and absorbent vegetable matter between the soil grains will all be filled with water. If more rain falls upon the box, the surplus must run over the top or be lost to the wind and the heat of the sun.

Many of the hard formations in our soils act the same as the water-tight bottom in the concrete box. For this reason, it is profitable to destroy these hard formations in order that our crops do not suffer from a lack of moisture during the dry period. It takes 32 gallons of water to mature one corn plant. On an acre that's equivalent to a small pond.

By driving out soil air, water forced to stand in the topsoil often brings about conditions detrimental to crops and will also result in surface baking. It also drowns beneficial soil bacteria, which need

**THE ROOTS of the plant on the left received plenty of air in solution; the plant on the right was stunted because there was no air around its roots.**

**THIS TYPE OF HARDPAN is prevalent in the semi-arid west. Here it lies about two feet below the surface, is six inches thick, and is underlain by porous subsoil.**




THESE SOIL SAMPLES are from one central Indiana farm. Samples 7 and 8 are from a hybrid corn seed field. Samples 1, 2, 3, 4, 5, and 6 are from soybean fields. Note the plowsole in 1, which was taken three rods inside the fence. Sample 2 was taken along the fence row and shows no plowsole. In 3 and 4 the plowsole compaction is very evident; they were taken in the middle of the field. No part of the field from which 1, 2 and 3 were taken had had deeprooted legumes in three rotations. Samples 6 and 7 are from another soybean field. Sample 5 is from virgin sod that had been plowed but once. Compaction is seen below the organic matter at plow depth and was caused by the weight of the tractor. Sample 6 is from virgin soil never plowed and shows no compaction until the subsoil is reached at the lower level. Note excellent tilth, conducive to good aeration. Samples 7 and 8 are from a corn field that had been in sweet clover two years previously. These show there had been excellent tilth until compacted by heavy cultivating (No.7) and detasseling (No. 8) machinery. The compaction in 8 is at least 10 inches deep and can not be corrected by ordinary plowing. A crop of sweet clover will help eliminate all these compactions. (Samples and analysis by Dr. G. N. Hoffer.)

air to live, and suffocates feed roots which must breathe oxygen much the same as the leaf system above ground must breathe.

### Oxygen

One of the truths of nature is the fact that oxygen is essential to the germination of seeds. In fact, oxygen is the only gas in the atmosphere in which seeds will germinate.

Soil oxygen is also a stimulant to the entry of plant nutrients in the root system. Without it growth becomes sluggish, and the nutrients do not enter the roots.

Roots breathe like animals, and like animals they breathe oxygen. Oxygen is taken from the soil atmosphere and carbon dioxide is realesed. This passes upward through the soil and is used by the leaves as their chief airborne food. This is a handy arrangement—the roots use oxygen and give off carbon dioxide; the leaves use carbon dioxide and give off oxygen.

There are various acids produced continually in our soils by plant roots and bacteria. They are mild acids and disappear almost immediately. As fast as they are formed they combine with the soil to form other compounds, some of which are used by the root system as plant nutrients.

If we could shrink in size small enough to walk through the air spaces in an average loam soil and explore it, we would find ourselves surrounded by boulders of different shapes, and colors. We would also find scattered through the soil a great many rotting logs which in reality would be decayed roots of plants and dead vegetable matter which has grown above the surface and reached the lower depths through tillage operations and root penetration. Both the boulders and logs would be damp with capillary moisture. We would find growing upon these old logs and upon the soil grains themselves various forms of plant life similar to the mosses, ferns, and molds we find above ground in damp, shady places. There would be other strange forms of life somewhat resembling plants living upon soil grains, upon the vegetable matter and even upon each other. All these various forms of life we call soil flora and bacteria.

In fact, there are far more forms of life below the surface of the soil than there are above it. The thing with which we are concerned is the fact that these are performing certain work. Some of them are our friends and some are not. These forms of life divide themselves into two classes. One is called "aerobic," or air-loving and is necessary to plant growth. The other is "anaerobic," and thrives in poorly aired soil. It is the enemy of plant growth.

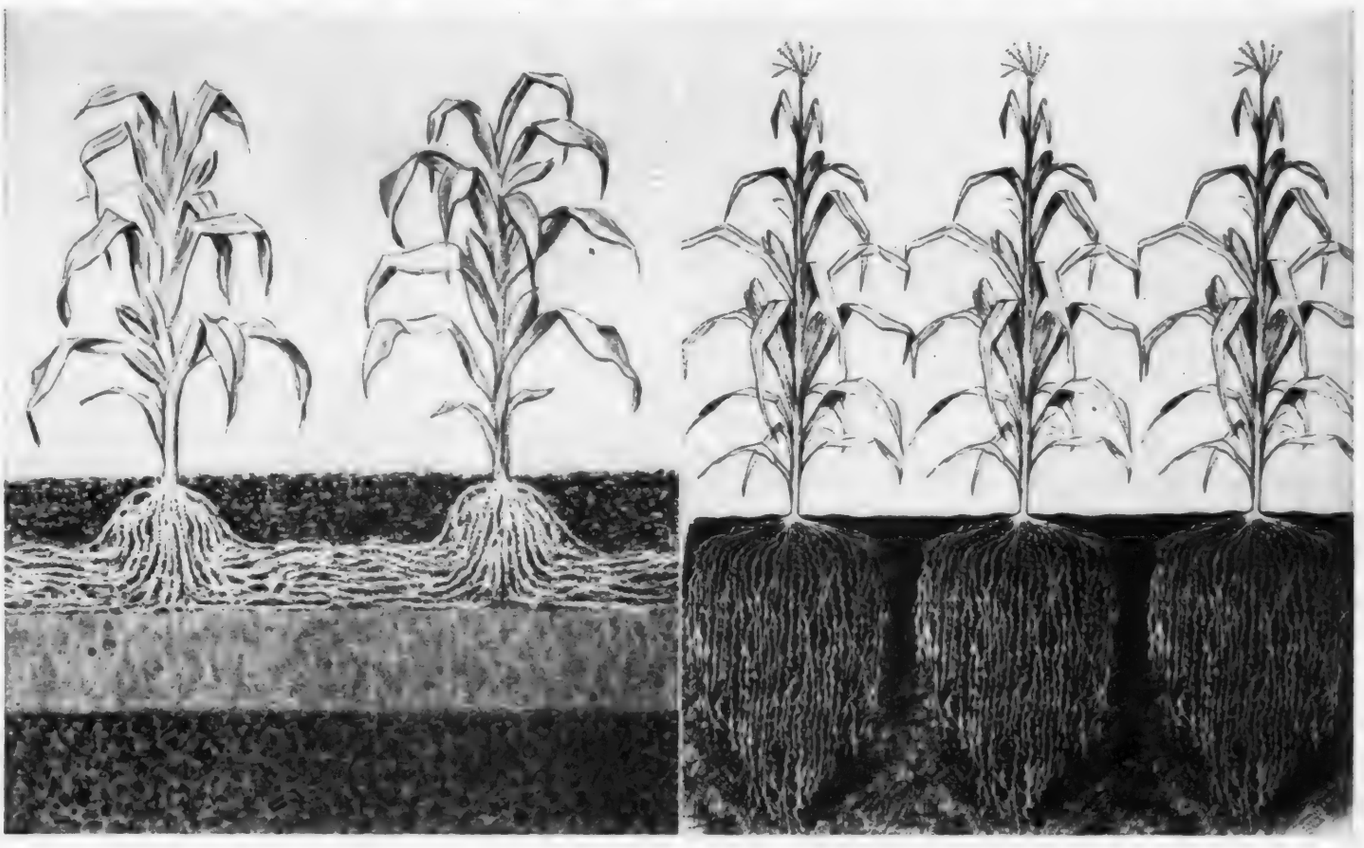
One peculiar thing is that carbon dioxide accumulates in the lower soils when a hard crust covers the ground or when the topsoil is wet and sloppy from standing water. If too much of this gas is present in the soil it will actually suffocate the aerobes and plant roots which produce it, and is injurious to roots as well. If you have ever slept in an airtight room with several persons you know what this means. Soil should be well drained and properly worked so that carbon dioxide can leave it as fast as it is produced in order to reach the atmosphere above ground and be useful to the leaf system of the crop. Many interesting experiments have been performed to prove the stimulation of crops by an increased amount of carbon dioxide in the atmosphere. A plant surrounded by pure carbon dioxide really goes to town.

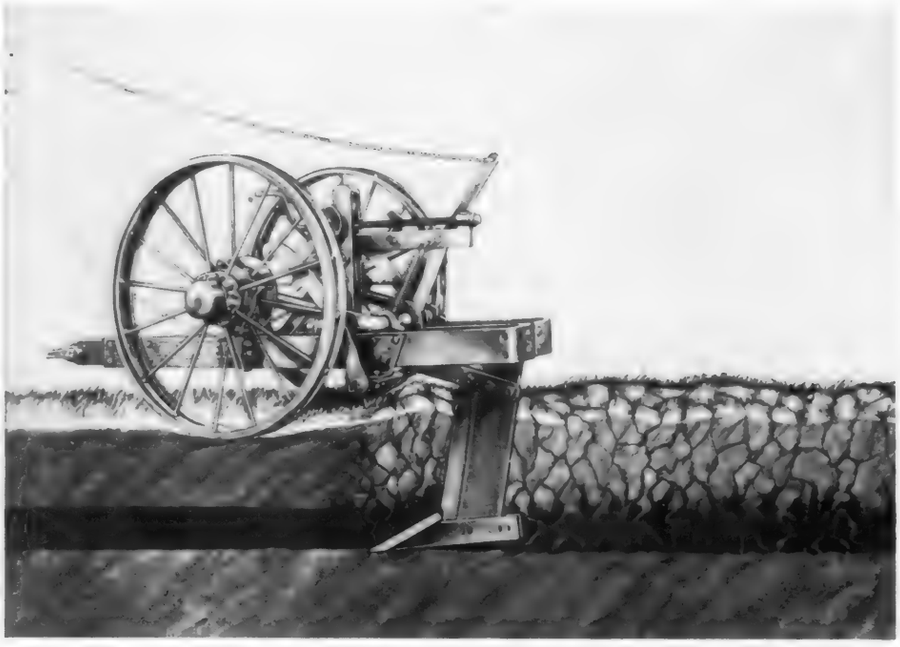
### Compacted Soil vs. Air and Moisture

If the topsoil is dense and compacted, then the farmer knows what to do. He works a crop residue or generous applications of manure, green or barnyard variety, into the soil to make it porus and friable. The topsoil is a comparatively open book to the farmer, but the subsoil and the so-called plowsole or hardpan which separates it from the topsoil is a region of darkness and mystery. It is this region that we shall explore, and we shall describe ways and means of admitting air, organic matter and moisture in order to stimulate it to take up part of the burden of producing a crop.

Below tillage depth we often find a layer of soil, quite hard and dense, especially if it is examined during the dry season of the year. A hole a foot or two in diameter dug through this second formation will show quite clearly the nature of the second layer of the soil. It will show how thick this layer is, how hard it is,

CORN STALK ROOTS "pancake" when they strike hardpan and compete with each other for oxygen and plant food. When hardpan is broken up they penetrate to depth and tap new sources of minerals. Roots are stunted when air is shut off.





A SUBSOILER penetrates below the hardpan, breaking up the compaction. Surface water has an easy entrance, runoff is reduced to a minimum, and roots penetrate easily.

whether roots are thriving in it properly and how well moisture has penetrated. This will also tell us how deep our tillage operations should be in order to overcome the handicaps of this tight subsoil layer, which is commonly called "plowpan," "plowsole," "kalkpan," or "hardpan."

It is surprising how generally this formation exists in our farm lands, especially in those which have been farmed for many years. Many farmers till their soils for years without ever guessing at the existence of this underlying layer, and do not know how thick it is or what the nature of the soil below it may be. Sometimes this layer, or second zone, will extend downward for several feet. Fortunately this is rarely the case. If it is the case, the land can be helped by working it as deep as possible, providing the expense is not too great to offset the crop benefits.

In most cases the second layer will not be thicker than 4, 6, or 8 inches and we often find below it a layer of subsoil which is quite loose. If we are to farm this land successfully, we should work our tillage implements just below the bottom of this hard layer at the dryest season of the year without bringing it to the surface.

This layer may be of three kinds. The most common kind is formed by heavy implements, plows, cultivators, disc harrows, combines, and tractors. The force of gravity pulls down fine dust particles through the air spaces each time the soil is tilled. These will gradually accumulate at a certain depth.

A similar hard layer may be formed by plowing soils when they are too wet, especially those with a high percentage of clay particles which will stick together easily when squeezed until the spaces between particles disappear and air is driven out. This is usually called "puddling." It is similar to driving a wedge in a horizontal direction through the soil. The soil just below the plow-share will be compressed downward by such an operation and the layer of soil just above the share is squeezed upward as the furrow is lifted.

There are other types of hard subsoils, however, which are known as natural "hardpan." There is the gray type, high in lime content, which is quite easily broken and when once broken does not run together again easily. It may be thick or thin, depending on the forces of nature which create it.

Another type is known as iron hardpan, which is reddish in color. This is much harder than the lime type, is not easily broken and when broken runs together again easily, when wet. This usually makes it necessary to destroy the iron type annually to keep the whole soil in its best physical condition.

### How to Ventilate the Subsoil

There are two ways of breaking up the compacted area; it can be done either by machinery or by nature, or both. Dr. George N. Hoffer, Midwest manager of the American Potash Institute and well-known plant physiologist and soil chemist, is the high priest of the nature school of thought. Dr. Hoffer maintains, and he maintains with logic and conviction, that the best way to break up the plowsole is to provide soil conditions by liming and fertilization to grow deep-rooted legumes and let nature take her course. His plan is double-barrelled. He points out that sweet clover and alfalfa have deep, husky tap roots that will penetrate the stubborn compactions, carrying with them their own organic mater which later decays, releasing their minerals and plant foods, breaking up the soil particles, and bringing in air and filling the subsoil with moisture-retaining organic matter. He says that after these crops have been in the rotation for a period old drain tile lines, dry for years, begin to flow and that during droughts corn planted on sweet clover gets along very well because of the reservoir of moisture in the humus-laden subsoils. On the black loam and sandy loam soils of the corn belt areas of Indiana, Ohio, Illinois, and Iowa, there are few who dispute Dr. Hoffer's recommendations. How well they hold on clay soils, where the plowsole and hardpan is denser, harder, and more stubborn awaits a try-out by dirt farmers on their own fields.

C. V. Conder, Lafayette, Indiana, farm manager, and student of soil chemistry and soil management as well as a practical farmer that must make farms pay off, follows the sweet clover-alfalfa method of aerating the soil. He has found this a

quick and economical method not only of improving soil aeration but also of supplying organic matter and nitrogen.

Condor says, "On many grain farms in the corn belt I found tenant farmers using red clover and timothy for hay, pasture and soil improvement. They did not have enough livestock to use much hay or pasture, so they either sold hay off the farm or had such a small amount that clover was grown only every six to twelve years. If hay were sold, plant food removal was equal to that in a 50-bushel corn crop and returns to both landlord and tenant were much less. I also saw that very little organic matter was returned in this method as the clover and timothy were usually dead when plowed under."

Setting up a program for these farms that would produce maximum income, yet at the same time improve the physical condition and production of the soil, caused Conder to scratch his head. He knew his new program must provide hay and pasture for the tenants livestock, soil improvement for the entire farm and make more money for both tenant and landlord at the same time.

When Conder acquires a new farm, he walks over it, sampling the soil, noting the topography, marking the soil types, etc. He then prepares maps showing present land use, soil types, acidity, phosphate and potash test readings and recommend crop rotations. At the same time a long range soil building and operating program is set up. Unless special land use is required because of soil type of topography, two rotations are usually used. Three fields, easily accessable to the buildings, with the size dependent on the amount of livestock the tenant wishes to keep, are set up in a rotation of corn-oats-mixed clover. The balance of the farm is divided into three fields, usually without fences, and is set up in a three-year-rotation of corn-soybeans-oats (or wheat) with a sweet clover intercrop. In this manner opportunity for soil treatment is provided, a clover crop plowed under for corn and yet practically all the farm is in high profit crops each year. Conder has found he can grow more corn with one-third of the farm in corn, the high profit crop, always following clover, than with a higher percentage of corn.

On one of his own farms in Benton County, Indiana, he took two fields of similar soil types and productivity which he planted to corn. One had been in corn the previous year, the other in sweet clover, both were spring plowed and received 200 lbs. 3-12-12 fertilizer per acre at planting. The corn following sweet clover yielded 128.5 bushels per acre. That following corn yielded 63.7 bushels per acre without supplemental nitrogen, and 97.1 bushels per acre when 80 lbs. of nitrogen (400 lbs. ammonium sulphate) was added. (The added nitrogen was approximately the same as that in the sweet clover plowed under.) This indicates that an increase of 33.4 bushels per acre can be credited to use of chemical nitrogen, and 64.8 bushels per acre for sweet clover. Yields are averages of three checks.

On another Benton County farm operated by James Berry 200 lbs. per acre of 3-12-12 fertilizer was used with corn planter and yields were as follows:

| | |
|---|---|
| Following sweet clover (no other treatment) | 102.3 bus. per acre |
| Following red clover and timothy (no other treatment | 49.6 bus. per acre |
| Following one year alfalfa (no other treatment) | 84.3 bus. per acre |
| Following corn (no other treatment) | 52.0 bus. per acre |

Varied amounts of supplemental nitrogen, plowed down and side dressed, were also used. The cultural practices were the same except following sweet clover where the physical condition of the soil was so improved that it was plowed, then gone over once with culti-mulcher and planted.

This elimination of usual operations in seed bed preparation saved much time, expense, and running over the land with heavy equipment that compacts the soil. In each test corn following sweet clover produced top yields. Profile soil tests showed the plow sole on the sweet clover plots had been broken up and the subsoil beneath to be full of organic matter and root residue. This provides a more favorable environment for plant growth and causes marked response of succeeding crops to treatment.

(Continued on page 116)

THE LOWER BLADES of the Oliver T.N.T. break up the plowsole.

THE ALLIS-CHALMERS hydraulic subsoiler penetrates 22 inches.

THE FERGUSON (tiller) is adapted to shallow-depth compactions.

THE MINNEAPOLIS-MOLINE Unitiller is adapted to surface tillage.

The air sings with bees, and the soft wind is fragrant with the scent of a thousand blooming things.

# *It's Spring!*
# *Ferdinand dozes dreamily alongside his favorite flower*

What does a little calf think of?

Ferdinand, the little Hereford pictured above, isn't thinking about much at all because he's snoozing in the clover. He had such a *busy* time. His mother's milk tasted mighty special this morning. Yesterday, the two of them were turned into a new green pasture for the first time this year and today her milk was tastier than he ever remembered. It smelled different, too. All that morning he chased after her, sucking first one teat then the other. Into the creek, up the hill, and under the apple tree. Wherever she walked, he followed. Finally, she nosed him away and lay down. He sucked in a mouthful of grass, chewed it and then suddenly pricked up his ears at the rasp of a scythe being sharpened in the bushes near the pasture fence.

The man with the scythe slanted the file against the edge of the blade and, with a stout grip, played it back and forth; first on one side, then on the other. The rough file put a wire edge on the blade. The man made a rhythm out of it, beating out three clicks on one side of the blade, and then three clicks on the other. A grey squirrel, hunting for last autumn's cache of acorns, heard the scythe and scurried out of the white bridal wreath bushes.

Ferdinand spotted a squirrel and chased it for a couple of yards and then slowed to a walk. Scattered over the pasture were blooming red tickseed. They smelled good to Ferdinand and he plumped down on the grass, rump first. His belly felt warm and full and the long clover grass was cool against it. A big empty thought rolled up into Ferdinand's mind and he got hold of it and pulled it around. His eyes closed and his jaw rested against his hoof. The flowers released their scent to his keen little nose and there was nothing to warn the tight animal trigger in his brain that always twirled around, sensing for danger. In another while Ferdinand would nose up to his mother again. Right now he snoozed among the flowers, and it was good to be there.

# *Old and young, greet the Spring, each in his own way*

Early in March when the crocuses have bloomed and are beginning to dry up and blow away, there comes the first good hotbed day. The skies look as though they never heard tell of rain or storm. The wind rustles the swelling buds on the old cherry tree, and the forsythia bushes are dormant save for an errant yellow blossom that hopped out too soon and looks as newly born as spring itself.

It's still too early to take down the storm windows around the house. Along the fence row, in back of the kitchen garden, the bleeding hearts, tulips and hyacinths raise slender green blades above the ground. In the hay field, the clover sown in February has taken root, and the ground is flecked with pale green. For the last week there hasn't been a freeze at night and today the sun has warmed things up so that a man can go around with a good flannel shirt and no coat.

Grandpop had been waiting out the weather, getting everything ready for his hotbed.

The frame is made of white cedar and has withstood the freezing and thawing of ten winters. The plants in Grandpop's frame used to grow tall and leggy, but recently he has been experimenting with a new commercial glass that lets in more ultra-violet light. A friend of his in the greenhouse business recommended it saying it licked the problem of leggy plants, except in cases of a week long overcast sky. Grandpop has just finished puttying in the new glass.

No one can mix a "hotbed batter" like Grandpop. About ten days before he thinks the weather will be ripe, he collects a pile of fresh stable manure around four

(Continued on page 70)

Ho! School is out and there are trees to climb, or a pony to ride and plenty of time to do the evening chores.

feet each way. He mixes this with one-third leaves, usually oak, beech, or birch. "Equalizers", he calls them. After mixing in the leaves he wets them down with a couple of buckets of water. In two days, fermentation takes place, and the batch steams. Grandpop remixes it and about the seventh day begins to worry about the sky. He wants a clear day; today he has it. Plain manure will keep a hotbed warm for two months, and by adding leaves, another three weeks is added, taking care of tricky little freezes that come up in May.

Grandpop digs two feet into the hotbed and puts the rich earth from there around his roses. Into the first 18 inches of the frame he packs manure, spreading it evenly and firmly. Into the last six inches goes some of the earth he has just removed. Grandpop is fussy about his hotbed and when a thermometer shows the temperature falling away from ninety degrees he starts to plant. He waters early every bright day, and always keeps the frame open a notch, closing it before the sun loses its afternoon power. When the evening weather looks frosty he covers the frame with a couple of feed sacks.

This morning Grandpop is laying pepper seeds in. He made straight rows by pressing the edge of a long board into the smooth, fine earth. He has a lard can full of earth and a sieve by his side ready to use when the seeds are put in. He will sieve earth over the seeds and then press the ground down with the flat side of his board.

Grandpop has a dozen hotbeds that he takes care of during early spring. People from the city drive out to buy his green peppers, cabbages, tomatoes, egg plants, and squash. He sticks in a few zinnias in the corners for Grandma but still she never forgives him for putting that good medicine cabinet thermometer into his hotbed batch.

"You'd think he'd have more sense," she says.

All that Grandpop asks is that when the redbud and dogwood begin to color up the hill sides, and the Herefords start to take down the new growth of grass, that he can be out there, breathing in the same air and feeling his feet sink just a bit into the springy earth.

"Spring? Well, that's a season old folks like best," he says.

Grandpop got out of his long drawers early in the spring, and on the first bright day Mom washed and hung out the striped bed spread.

EVEN a new-fangled machine like a Rotary Tiller doesn't make an August sun seem any cooler. Using his six-foot Tiller, George Lewis of Newtown, Ohio has prepared up to 20 acres a day for planting, with a single pass over the soil.

This is the business-end of a six-foot Tiller. The tines and hood on this machine are designed to prepare a fine, medium or coarse seed-bed. The revolving rotor gives about 18,000 strokes a minute to dig, mill and till the soil.

# THE ROTARY TILLER

ABOUT ten years ago a revolutionary soil working tool was introduced to farmers in the Midwest. It was called a Rotary Tiller. It was the first radical change from the usual moldboard plow, which is credited to the inventive mind of Thomas Jefferson. The Rotary Tiller, in one pass at the average Midwest soil, prepares the seedbed, eliminating the additional operations which are necessary after plowing. The soil is broken into smaller particles than by conventional preparation methods, and fertilizer, lime, and vegetation are uniformly distributed throughout the depth of the tillage.

"Rotary Tiller" is a good name for this machine, for the work is done by a row of tines, claw-like pieces of metal, that are mounted around a revolving shaft. The speed with which the tines hit the ground can be increased by increasing the speed of the motor that drives the rotor. About 300 r.p.m. is the operating speed most often used. The perennial enemies of using any kind of tined tool in soil preparation — rocks and stumps — have been taken care of with a safety clutch for each series of tines. A tine striking a stump is released and rides over it.

The Rotary Tiller is pulled across a field by a tractor at about two miles an hour. The power for operating the machine may be taken from the tractor power take-off for small models. In the larger ones it comes from a separate engine mounted on the Tiller. The revolving tines of the Tiller dig into the soil, throw it up against the hood of the machine, where it is broken into small particles and well mixed with air and the organic matter and fertilizer that is on top of the soil. The soil drops down into a fluffy, finely pulverized bed that will gladden the heart of any seed, making it

(Continued on page 112)

**THIS IS THE WAY SOIL LOOKS AFTER ROTARY TILLING**

*The Tiller above is being pulled at a speed of 5 miles an hour. The hood of the machine has been hung open to give the best soil aeration and leave a straw mulch on top of the ground to prevent erosion.*

THE HORSE, man's longtime helper, gets his fuel from the farm's fields and streams, and returns fertility to the growing crops. Although the horse population on American farms has decreased for 20 years, many farmers still say they can't get along without a team.

# HORSES ON THE FARM

MANY a farmer who holds on to his farm team in the face of increasing mechanization around him is a downright sentimentalist. He is like the Pennsylvania Mennonite farmer who expressed himself to a more worldly brethren like this: "I really enjoy getting my hands on the lines back of a team of horses. They find the rows much better than a tractor when the stalks are heavy and mash the ground less, in any kind of weather. With horses I feel I am working with old friends."

Not so many people feel that way any more.

Horses on farms are on the decline, and with the assortment of new tractors now on the market, from one-lungers that junior can play around with in his own strawberry patch up to giant crawlers that pull 40-foot discs, horses can be expected to continue to decrease in numbers. There is hardly a farm job that can't be done with gasoline if you have the cash to lay out for the equipment and the gas and oil. From 1920, when the horse population was 22 million, it had dropped to 12 million in 1943. The present figure is about 10 million; broken down it figures 7 million horses and 3 million mules.

But there are farmers all over the country who are keeping their teams after they buy their second tractor. They have practical reasons for feeling that their teams earn their oats. They'll tell you that they can't farm without horses. They'll ask you how *you* haul your feed out to the beef cattle when the ground is soft, so that you don't start washes on the slopes. They want to know what you do with the manure when a tractor's wheels start spinning as the power is put to a heavily loaded spreader. They may even be so unkind as to hint that prices may not hold up to their present levels and that some day you'll be mighty glad to be able to feed your team off the pasture and grain fields of your farm. Some will ask you if you can get your gasoline man to make deliveries as promptly as he used to, and if you are rationed too.

### Man's Long-Time Pardner

So let's take a critical look at the horse, consider what his performance record has been in the past, and what it must be in the future to make him more than a sentimental hobby on the farm.

Our history books tell us that the early settlers cleared the eastern tidewater slopes with horses, then lumbered westward to the great plains in Conestoga wagons drawn by teams. When they arrived at their destination they converted their transportation power into farming power and turned the plains, dammed the rivers and made grain and grass grow where prairie hens and jackrabbits thought they had a perpetual lease.

Light, fast and tough horses carried the mail back east. The ranchers used Quarter Horses and cross-breeds with Arabian blood to ride the range and rope the cattle. Here were horses in a variety of essential uses in America, yet none of them had been here when the first settlers arrived.

Cortez, one of the first explorers of this continent, recorded that there were no horses found on his expeditions into the interior of Mexico in 1519. The Indians were easily subdued by his warriors in polished armor riding on big, strange

JACKIE COOGAN, Francis Eustis' 15-year old Belgian stud, gets a nod and a whinny from three girl friends as he comes in from the water trough. Eustis dispels the old idea that you can't work a stallion in a team with a mare, by pairing them up even when the mare is in heat. He uses two teams of horses and two tractors on his 400 acre farm near Lebanon, Ohio, to supply his power requirements.

**A MIXED TEAM, one horse and one mule, pull the heavy sprayer through C. J. Nobis' hilly orchard for the first lime-sulphur spray of the spring. Nobis says, "On our farm only a team or a crawler type tractor can get through the mud for these early sprays. Bugs and fruit diseases don't wait on the good weather; you have to get your sprays on the trees on the right day."**

animals that towered above them.

Yet the ancestors of all the horses in the world came from the North American continent. The mystery of their disappearance from this continent has never been solved. Of course a lot of things can happen in 50 million years, and it was that long ago that the first horse, the Eohippus, lived here. The Eohippus, or dawn horse, had to be a sly and crafty fellow, for he had no very effective way to protect himself, except to high-tail it into the forest. He was about the size of a red fox, and had a horse-like mane and a tail. His front feet had four toes, and his hind feet had three. By the time the Ice Age arrived his descendants had spread over all the world, and he lived on all the continents except Australia. By this time, too, he had passed through several stages in his development. For a while he had been a Mesohippus, or middle horse. At this point he had been about the size of a collie dog, and had lost the extra toe on his front feet. The horses that survived and multiplied after the Ice Age grew larger and were similar to the present day Monogolian pony, small, chunky and shaggy animals of great stamina.

But the horse was an adaptable, friendly and useful animal, and he was in great demand in the ancient world. One of the first written records of horses is in Genesis, the first book of the Bible. Here the Romans and their chariot races are mentioned. While the Romans were developing and breeding horses for this rough and tumble sport the Goths figured out a military use for them. When they descended upon Roman legions it was with swift cavalry movements as surprising and effective as those of the German panzer divisions in World War II.

The ancestor of the modern draft horse as we know him today came to England in 1066. He was also a warrior's horse. With his mounted knights, William the Conqueror swept the British from the field and made them extremely horse conscious, a trait that has continued to the present time. The horse soon became an item of national defence in every country in Europe.

It is curious to note that agriculture seems to be the last use to which the horse was put. In Wales in 1200 there was a law forbidding the use of horses for plowing. And in other countries he was considered too valuable in sports, war and transportation to be hitched to the plow. Oxen were used to do this lowly work. The earliest suggestion of a horse being used in plowing comes from the Bayeux tapestry, in which a horse is shown pulling a harrow. The Bayeux tapestry, which was started shortly after the Battle of Hastings (1066A.D.) by Matilda, the wife of William the Conqueror, is 214 feet long by 20 inches high. It is often used as a reference for 11th century manners and dress, and it shows that the Normans were on their toes with all the new ideas, such as graciously allowing their war horses to give the hard-working peasant farmer a lift. Times changed and by the 15th and 16th centuries horses were being generally used in farming.

From the Normans, Spaniards and Belgians on the continent and the English have come our five main types of horses in this country. There are the draft horses, saddle horses, coach or heavy harness horse, roadsters or light harness horses, and ponies. Draft horses, from which our farm teams are bred, are by far the largest horses. They may weigh as much as 2300 pounds. They have powerful muscles for starting and pulling heavy loads, and through breeding they have acquired agility, beauty and stamina. One of the breeds of draft horses, the Shire, is known to have descended directly from the great Norman war horses of the Middle Ages.

### How Much Work Can Horses Do?

The common measure of work done by horses, tractors or any other kind of power producing machinery is a unit called a *one horse power*. This is the performance of 33,000 foot pounds of work in one minute. For example, if a horse exerts a pull of 150 pounds while travelling at a speed of 2.5 miles per hour (which is 220 feet per minute) it will do 150 times 220 foot pounds of work a minute, or 33,000 foot pounds. This would be exactly one horse power.

The amount of work that horses can do varies with their weight, muscular development, endurance, feeding, age and health. The steady work for a horse, the pull or draft as it is called, should not be more than $\frac{1}{8}$ to $\frac{1}{10}$ of the horse's weight for the 10-hour day that a horse is usually worked. On an average, the 1,000 pound horse working steadily for a 10-hour day can develop from $\frac{6}{10}$ to $\frac{8}{10}$ horse power. The 1,600 to 1,800 pound horse will develop up to 1.5 horse power.

If you have tried to move a big range shelter that made a tractor's wheels skid you may have wondered how a team of horses, which you would credit with a total horse power of two, could be hitched up to the same shed and after an initial heavy straining pull, walk away with it. The secret is that for a brief interval a well-trained horse can develop 10 times his normal rate of pull, or up to as much as his own weight in pull. A few horses can momentarily exert a pull even greater than their own weight. There is no tractor, motor or other machine that has this capacity for overload. This reserve power is of great importance in farm work. For example, it may require 10 times as great a pull to start a loaded corn wagon in soft ground as it will take to pull it on a gravel lane once it is in motion. It is this reserve power that makes the horse still unequalled at certain types of work, on uneven ground, up steep grades, in muddy ground, and for other pulls where great effort is needed for a short time.

### Who Should Use Horses

There is no hard and fast rule that a farmer can apply to decide what farm

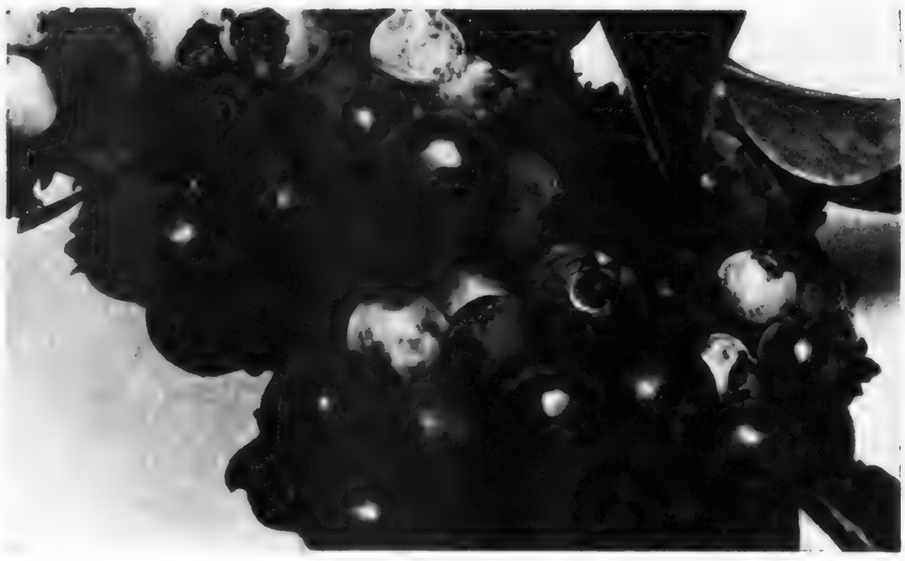
(Continued on page 129)

A FINE TYPE Suffolk work horse with his tail fixed up for showing, not working.

A SPANISH JACK. When he is crossed with a mare horse, the offspring is a mule.

BREEDS OF DRAFT HORSES

| Breed | Place of Origin | Weight in Lbs. | Height in Hands (4 inches) | Color |
|---|---|---|---|---|
| Belgian | Belgium | 1700-2200 | 15-3 to 17 | Chestnut, roan, bay, brown, black or grey. May have white star, strip and white on legs. White or silver manes and tails. |
| Clydesdale | Scotland | 1500-2000 | 16 to 17-1 | Bay, brown, black, chestnut, roan, grey. White strip on face and white legs to knees and hocks. |
| Percheron | France | 1600 to 2100 | 16 to 17 | Black and grey most common but also may be brown, bay, chestnut or roan. May have white star. Strip and some white on legs. |
| Shire | England | 1800 to 2300 | 16 to 17 | Bay, brown, black, roan, chestnut or gray. White strip and usually white legs to knees and hocks. |
| Suffolk | England | 1500 to 1900 | 15-2 to 16-2 | Chestnut only, but may have a small star on forehead. |



# BLUEBERRIES

BY GEORGE LAYCOCK

BY THE time Wesaw finished filling his basket with the wild fruit and started for Reverend Spelman's house the sun had climbed high in the heavens and the Michigan countryside was quiet with the inactivity that accompanied the late summer afternoons. The Indian with his basket of blueberries knocked at the parsonage door.

Eight-year-old Johnny Spelman opened the door and, seeing the Indian, called to his father. First, Reverend Spelman noticed the hand-made basket. He bought the fruit to get the container. John R. Spelman who opened the door that afternoon in 1881 still owns that basket and on the land where the Indian had filled it with blueberries, Spelman now grows enough of the berries to fill Wesaw's basket several thousand times each year. He expects his full grown bushes to gross $1,500 per acre annually on land that is too wet, frosty and acid to grow any of the common farm crops.

Within the past 25 years blueberries have become big business in the areas where they grow best. The major growers may own a hundred or more acres and employ up to 200 pickers during the harvest. Scattered across the country, however, are smaller plantations ranging from an acre or two down to a couple of bushes by the garden fence to supply fruit for blueberry pie or add their flavor to muffins baked in the farm kitchen. Those bushes last a lifetime; they usually produce for 40 years.

When I started out to learn about blueberries I travelled first to South Haven, Michigan, the center of blueberry culture in the Midwest. John Spelman has more acres of blueberries than any other person in Michigan. He started to grow the fruit 15 years ago when blueberries became the vogue for the southwest corner of the state along the shores of Lake Michigan. Today he is 74 years old but manages 90 acres of blueberries that last year brought a gross income of more than $25,000 just for the plants he sold to other farmers all over the country. "Blueberry growing," said Spelman, "will become one of the most important fruit industries in this part of Michigan, and we grow many kinds of fruit here."

He started growing blueberries after he had failed to make a profit on his land with other crops. "I had this piece of land over by Covert," he says, "and tried to grow everything I could think of on it but lost money every year. I tried hay, buckwheat, vegetables and strawberries and when I did get a crop the quality seemed lower than it should be. About once in every three years either an early fall or a late spring frost killed most the crops. Everybody else around here thought I was an old fool for trying to farm it, I guess. That land wasn't worth a picayune." He paused for a moment while he reached for the old black topcoat that he wears around the farm, in cool weather. "Would you like to go out there?" He was getting into his coat and pushing his white hair back under a hat that had once been bought for Sundays. "I go out every day when I can find someone to drive me," he said. "My eyes aren't good enough for me to drive anymore."

The land between Toquin and Covert, where his blueberries are, is desolate country. There are lowlands covered with ferns and grasses and an occasional spot of aspen. There are higher sandy spots too, too poor to grow even the ferns.

Spelman pointed out some swampy fields. "There's blueberry land. Almost

tell that by the looks of it. Of course you have to test it before you plant berries because one of the biggest mistakes a blueberry grower can make is to plant on land that is too sweet or alkaline."

Spelman bought his first blueberry plants from the Experiment Station at South Haven. They were New Jersey stock and the farmers could buy up to 50 plants each at 30 cents per plant. "That was my start in blueberries," he said. "Then the next year we got 50 more at another 30 cents each. I planted those. I wanted to go into it bigger then but no one would sell me any plants." Dr. Keefe who owned a neighboring farm and had started the first blueberry plantation in Michigan already had several acres but he was using all his new plants for his own fields. Spelman decided to visit blueberry farmers in New Jersey.

New Jersey is the leader in blueberry production and has held that position since the berry came under cultivation 30 years ago. In the East Spelman bought 6000 plants and from that stock plus his original 100 plants, he planted his entire 100 acres.

He now owns 320 acres of land that 15 years ago could have been bought for about $10 an acre. "One 40-acre piece was bought for $100 at a bank auction," he said. "Another 40 acres was originally bought by a city fellow for delinquent taxes. There was a mix-up in the deeds and he thought it was on the lake. When he found out it wasn't on the lake, but between two pieces of land that I owned, he was ready to sell, and I got it by paying the back taxes of $206.

"These blueberry rows are half a mile long," he said, pointing toward a field of 10-year-old plants, "and those over there are a quarter of a mile. See those aspen over beyond the blueberries? Well, they're 30 or 40 feet high. This whole thing was like that when I got it. Had a bulldozer come in and push the trees down. Then we burned and cleared them off. Then we plowed the land and made a good seedbed. Next we marked the rows out and planted the young blueberry plants five feet apart in rows 10 feet from each other. That takes 860 plants to the acre. Some people are still planting them four feet apart in the rows. The experiment station doesn't recommend it any more and I don't want any bushes on my place that close together. They grow up too tall, instead of spreading out, and first thing you know you have to get a stepladder to pick 'em.

"Now see this one; it is getting too tall already and we trim them every year." He reached to the top of one of his older bushes and pulled a branch down where I could see it. "See all those buds?" he asked. "Going to be a honey of a crop next year. These buds set on in the fall like this and if the weather is good when they set we get a good crop of buds for next year. This year we had good weather. I figure the two reasons we can raise blueberries here is because of the acid soil and Lake Michigan. The Lake protects us from frost a little longer than the land more to the east." It frosts there too early in the fall and late in the spring for other crops but it gives blueberries enough time to do fine. He half turned and pointed to a barren field beyond some blueberry nursery stock that his farm hands were busy transplanting. "Just to show you about the frost," he continued, "see that patch of potatoes over there, beyond those young plants."

"No, I don't," I answered as my eyes searched the barren field.

"No, of course you don't," he said. "Frost got 'em."

**DRESSED FOR the picture more than the picking this farm woman fills 30 to 40 quart baskets a day. This mulched field is picked once each week during the harvest season.**

### The Types of Blueberries

The blueberries that John Spelman, and most of the other commercial growers, depend on today for their planting stock are the high bush type. There are three types of blueberries, the high bush, low bush and rabbiteye. All are native American plants, all grow both wild and cultivated. The rabbiteye blueberry is a tall plant grown commercially in Florida and nearby states.

The low bush grows in the higher elevations and farther to the North. In the localities where they grow wild on the mountain sides they were food for the Indians and the people who live there pick them, sometimes for food and sometimes for market. It yields fewer berries, however than does the high bush. Some state experiment stations are studying their possibilities for cultivation in the sections of the country too far north for the high bush.

The first commercial shipment of cultivated blueberries was made from New Jersey in 1916. By 1946 there were 4000 acres under cultivation, about 2000 in New Jersey, nearly 1000 each in Michigan and North Carolina. The rest are in scattered

LOWBUSH blueberries are picked with a hand rake and a strong back. They grow wild in high elevations. Periodic burning keeps them producing.

THIS CLUSTER of flowers lays the groundwork for fresh blueberry pie on the family table. Flowers and fruit grow at the ends of branches on last year's wood.

plantings in parts of New England, New York. In the Pacific Northwest farmers are getting into blueberry growing in a big way.

**Soil Requirements**

A drained swamp is usually the best place for a blueberry field. The land on which Spelman has his berries was once under water. "I figure it must have been a part of Lake Michigan one time," he says. The best land has a layer of peat three to five inches thick over a layer of sand, preferably coarse. Below the sand should be a layer of impervious clay or other material to keep the water table within 20 to 30 inches of the surface of the soil. Blueberry land should be moist but not wet. During the growing season they need a lot of moisture. Flooding of the plants does them little good, however, and the land should be drained to keep flood waters off the fields. Spelman has one piece of a few acres that "you could row a boat over in the spring. We're getting our drainage ditches built though now and that should take care of the flood water." Land that is too wet may heave during a freeze. "In wet years," Spelman added, "freezing and thawing can push the plants right out of the ground."

On land that has been drained for several years there may no longer be a peat layer on the soil. This is the case in southern Michigan. "This all grew up to trees after it was drained," Spelman continued. "and the forest fires probably burned the peat off, because that stuff will burn when it gets dry and you just can't put the fire out. Now we have to add peat to this land. I've bought a piece of bog land over on the edge of the farm that will supply us with all the peat we need." He bought it so he would not have to buy peat and have it trucked in. "Even with our own supply like this, I'm spending $3000 putting peat on my berries this year. Had to have a crane come in and dig it." The hole left after the peat was dug has filled with water and is now a natural reservoir for the irrigation he plans to use during dry summers. This added water will help insure a good stand of buds for the following year's fruit.

Spelman like many other blueberry growers is changing the character of his land to make it ideal for the fruit. The peat will add humus and help keep the soil acid. For his new plantings he is digging holes for the plants with a tractor powered post hole digger and throwing half a bushel of peat into each hole before he sets the plants. For his old plantings he is spreading the peat on the surface.

A piece of land is probably acid enough for blueberries if there are such plants as huckleberries, sorrel and spirea growing on it. If it is not acid enough the pH can be brought down by mulching with oak leaves or oak sawdust for the sandy soils that lack humus. When the pH is 4 to 5.5 it is right for blueberries.

When the sand and humus are already present but the soil is on the sweet side it

can be made acid with sulphur. On soils that run to sand apply the sulphur at the rate of 1.2 ounces on every 100 square feet for every one tenth pH over 4.5. On loamy soil add four ounces for each one tenth pH over 4.5. This step should be completed a full year before the plants are set and the sulphur should be thoroughly mixed with the soil. A bale of peat worked into every 100 square feet will give added insurance against failure. The fields should be tested every year or two and kept down to the proper acidity. Acidifying land for blueberries, however, is tricky business. The farmer who plans it should first go into a huddle with his county agent.

If the acidity of the soil is allowed to go too high, blueberries often are dwarfed and produce little if any fruit. "One year I had a display at the Detroit Garden and Flower Show," Spelman recalls, "and I don't know how many people came up and asked me why their plants didn't grow. I'd be willing to bet that in most cases they planted them on their sweet soil just like I did my first 50 plants and they probably had the same results. Mine didn't do so good until I moved the stock over on the acid land." Other reasons for failure could be lack of water, poor fertilization or severe temperatures.

In the wild, blueberries are found in both swamps and on the mountain sides. At first glance, this looks as though they have a wide range of growing habits, but actually the conditions are about the same on both locations. They are both acid and the berries in the mountains get their moisture from layers of humus and leaves that trap the moisture, and hold it. Slash lands covered with a thick layer of moisture-retaining humus are often ideal for the high altitude plantations.

Blueberries grow best where neither winter or summer temperatures become extreme. A cold spell where the thermometer hits 20 below can injure the plants. A late spring frost can damage the blossoms and young fruit especially where the land forms a frost pocket. Unfortunately the best blueberry land is often in a frost pocket. Danger from frost can be diminished by clearing off the woods or hedges that slow down the air movements around the plantings. New Jersey farmers are using sprinkler type irrigation systems or even flooding the fields when a frost threatens the crop.

Blueberries may do well on thin land with little water for the first few years after which they will have to be supplied with both water and peat to keep them producing.

### Prepare for the Berry

The next step after the field is selected is to prepare a good seedbed. "Once we clear this swamp land," Spelman said, "we plow it up just like we would for corn or any other crop." Plowing should be deep enough to penetrate the peat and bring some of the sand to the surface. After plowing it is a good idea to let the land lie fallow for a year before it is planted. This gives the grubs and weeds a chance to die off, and some of the vegetation a chance to decay.

BASKETS OF blueberries go from field to packing house where they are graded for size, inspected, rounded out and capped with cellophane for the journey to market.

*Highbush blueberry varieties ranked in order of importance for each characteristic.*

| Rank | Season (early to late) | Size of berry (large to small) | Dessert quality (good to poorer) | Color (light to dark blue) | Shipping quality (good to poorer | Cold resistance (hardy to tender) | Bush shape (erect to spreading) |
|---|---|---|---|---|---|---|---|
| 1 | Weymouth. | Dixi. | Stanley. | Stanley. | Jersey. | Wareham. | Rubel. |
| 2 | June. | Atlantic. | Wareham. | Jersey. | Burlington. | Jersey. | Rancocas. |
| 3 | Cabot. | Pemberton. | Pioneer. | Concord. | Rancocas. | Stanley. | June. |
| 4 | Rancocas. | Scammell. | Dixi. | Atlantic. | Atlantic. | June. | Scammell. |
| 5 | Stanley. | Jersey. | Atlantic. | Rubel. | Rubel. | Scammell. | Pemberton. |
| 6 | Concord. | Weymouth. | Concord. | Burlington. | Wareham. | Rubel. | Stanley. |
| 7 | Pioneer. | Concord. | Burlington. | Cabot. | Scammell. | Rancocas. | Jersey. |
| 8 | Scammell. | Stanley. | Pemberton. | Rancocas. | Pioneer. | Cabot. | Concord. |
| 9 | Dixi. | Wareham. | Scammell. | Dixi | June. | Concord. | Wareham. |
| 10 | Atlantic. | Pioneer. | Rancocas. | Pioneer. | Stanley. | Pioneer. | Burlington. |
| 11 | Pemberton. | June. | Rubel. | Scammell. | Pemberton. | | Dixi. |
| 12 | Rubel. | Burlington. | Jersey. | June. | Cabot. | | Weymouth. |
| 13 | Jersey. | Rancocas. | June. | Pemberton. | Concord. | | Atlantic. |
| 14 | Wareham. | Cabot. | Weymouth. | Weymouth. | | | Pioneer. |
| 15 | Burlington. | Rubel. | Cabot. | Wareham. | | | Cabot. |

### Planting

The 860 plants for an acre of blueberries can usually be purchased for about 35 cents each for two-year-old nursery-grown cuttings. This makes the total cost for plants close to $300. Some of the older, more plentiful, varieties can be bought cheaper, sometimes as low as five cents each for shoots. Once you have an original stock of blueberry plants you can enlarge your plantation from this stock. Spelman expects the sale of stock to drop off within the next few years. "Everyone is planting their own stock now," he says. "So far I've been making more from the plants than I have from the berries. In 1945 I sold $30,000 worth of rooted plants and whips. So far this year I've sold $25,000 worth.

STANDARD PROCEDURE in developing new varieties of blueberries is to shake the pollen from the flower of one plant on the thumbnail, which this scientist has already done, and from there dust it into the flower of the second plant.

THIS THREE YEAR old commercial planting in New Jersey will reach full production in six to 10 years. Cultivation keeps weeds down and soil loose. Some growers protect plants from winter heaving by sowing cover crops of rye or oats.

That's on the way out though," he adds, "won't be long 'till the market will be overloaded."

The plants should be set in holes so that they are a little deeper than they were in the nursery beds. Where the soil is dry the holes should be deeper to get the roots to the water supply. Where there are low spots in the field the plants can be set on ridges to keep the roots from being submerged. It is best to plant at least two varieties of the many available. This permits cross pollination which in turn gives bigger yields of better fruit. The large scale growers plant a few rows of one variety then a few of another to assure cross pollination. "I have 15 varieties here," Spelman said. "That way too, I have varieties that mature both early in the season and late so the harvest is spread over a period of two months and the pickers have steady work. Pickers are a big problem. We employ about 160 here every summer and you have to give them a place to live as well as good work. Last year we paid them eight cents a pint. When our plantations get into full production we'll need a lot more, and I don't know yet where they're going to come from." The best time for transplanting is early spring, but the bigger growers have to do the work when they can get at it and that means fall planting for much of their stock.

Blueberry fields need cultivation to keep down weeds and keep the soil in good tilth for aeration. The plants are shallow rooted and the cultivator should not get close enough to the bushes to injure the roots. Some growers fight the weeds with a permanent mulch of oak leaves, acid peat, or sawdust.

The plants start to bear when about five years old and three or four feet tall. A mature bush ten or fifteen years old should yield about eight pints of berries. "This yield," says Spelman, "will add up to about 7,000 pints an acre. That's what we aim for."

Harry Wakeman, a neighbor of Spelman's who has 13 acres of blueberries, kept a record of one bush's yield last year and found that he picked 19 quarts from it. "We probably had several others," said Wakeman, "that would do just as well but we couldn't keep track of all of them."

### Fertilization

The long productive life of a blueberry plant usually depends on the way it is fertilized. "We have been putting on seven ounces of fertilizer to the bush," Spelman said, "but a little more won't hurt." Seven ounces to the bush totals about 400 pounds per acre where there are 860 bushes per acre. The fertilizer program varies with the soil and the condition of the plants. The fertilizer needs can be figured on the bearing of the bushes.

He had been talking about fertilizer in one breath and the need for poor soil in the next until I was a bit confused. "Mr. Spelman," I asked, "if they do best on the

**THE AIRPLANE and the blueberry are friends. Growers arrange with their associations to have planes buzz their fields at low altitudes and dust them with insecticides. This Bell Aircraft Helicopter does the job for about $1.50 an acre plus cost of materials.**

poorest land you have, why do you need so much fertilizer?"

"By poor soil up here," he answered, "we mean the fields that are so acid they won't grow other crops or the ones that are so wet they're almost worthless for the common crops. Blueberries, just like corn or potatoes, grow bigger on what they can take from the earth and when they use up the plant food we have to feed them more if we want 'em to grow berries for us. Blueberry land needs humus and fertility even if it is acid."

Fertilizing the crop the first year it is transplanted from the nursery beds to the fields is a job that takes special care. These youngsters are usually set out in April and the fruit buds are pruned off so their strength will go to the growing of new wood. They are still small and require small amounts of fertilizer, usually 100 pounds an acre is enough. It should be applied when second leaf growth has begun. For example, if plants are set out while dormant, as they usually are, apply no fertilizer while the first crop of leaves is unfolding and changing from light to dark green; wait for new growth. If plants are set out in leaf they may be at a standstill for two or three weeks. Then when the new growth has begun apply the first application of fertilizer. If the fertilizer is spread too soon the leaves may turn red and the plants be set back several weeks in starting their new growth.

When the plants are still young they require less fertilizer. Healthy bushes should bear one-half pint of berries the second year after transplanting, one pint the third year and two pints the fourth. To keep them supplied with fertilizer at this rate of production an acre will need about 200 pounds the second year, 325 pounds the third, and 450 the fourth. On good blueberry land one-third more fertilizer will often double the production and still allow the plants to grow larger tops.

If a planting is composed of well-pruned bushes capable of bearing two quarts of berries each, 600 pounds of fertilizer per acre should mature the crop and produce enough new wood to insure a larger crop the following year. Bushes ready to bear three quarts can profitably use 700 to 800 pounds per acre each year. This should be plenty of fertilizer for most fields, and the growers experience with his particular fields should guide him in increasing the application.

After the first year half of the fertilizer should be applied at the end of April and the other half during early June. Always keep it a couple of inches from the stem of the plants, to protect them from burn. Fertilizer burn shows up by turning the leaf tips and edges brown.

A farmer can add too much or too little fertilizer to his blueberries and the result usually shows up in the crop. If the plants get more than they need they grow too much of the late soft wood which bears

(Continued on page 92)

# Crows

## DARK ROBED VILLIANS? FRIENDS IN DISGUISE?

BY KARL MASLOWSKI

PRIMITIVE man held animals in high esteem. Some he set up as symbols of his own fierceness in combat, others which he feared less were treated with gingerly respect. But as soon as man put aside his spear and took up the hoe he began to look upon nearly all wildlife with suspicion, for he classed it as a competitor. He was not always sure of the facts, but rather than give animals the benefit of doubt, he considered them all as possible predators on his crops and flocks. Some species were persecuted unmercifully.

This antipathy and prejudice has continued even into the industrial and atomic age despite the fact that science has proved that in most instances man has persecuted wildlife unjustly. For example, just last spring I found a North Carolina farmer beating a handsome milk snake to pulp because he still cherished the fantastic belief that this serpent sucked milk from his cows. And on a barbed wire fence in eastern Arizona I saw the rotting bodies of a dozen hawks, including red-tails and Swainson's, which a rancher had killed, thinking that he was ridding his range of vicious predators. Impartial investigators long ago proved conclusively that milk snakes do not steal milk from the farmers' cows, but do keep down the rodent and insect populations, and that red-tailed and Swainson's hawks are friends of man because they catch gophers, rats and mice.

Probably no other species of wildlife has been the subject of more bitter controversy than the crow. Hunters, farmers, nature lovers, and ornithologists have gone around and around repeatedly over the economic value of this bird. Some have damned these black-robed creatures as cowardly rascals capable of committing more crimes than a Dillinger, while others have placed them on a pedestal and clothed them in innocent white down.

Crows are as much a part of the American farm scene as are fodder shocks and barbed-wire fences; it has been said that if a person knows only four kinds of birds one of them will be a crow. Adults range from 17 to 21 inches in length and are clothed in feathers as black as the proverbial black hat. When seen in the proper light the upper parts give off a deep, greenish-purple reflection. This dusky ensemble is made even more somber by the legs and the two-inch long mandibles which are also black. Brown eyes do little to enliven this monotonous color scheme.

Albino or partially albino crows apparently are not too rare, for almost every natural history museum in the United States has from one to a dozen specimens in its collection.

The stories that are told about crows frequently credit them with intelligence about on a par with that of a Quizz-Kid. There are tales which tell of crows having "spies," "scouts," and "schools." Henry Ward Beecher said, "If men wore feathers a lot of them wouldn't be clever enough to be crows."

### Crow Sentinels

In popular literature and folklore crow sentinels are frequently mentioned. Apparently, when a flock of crows are feeding in a cornfield or along a river bank there are always one or more individuals perched on some tree or other high spot from which they have a good view of the surrounding terrain. As a consequence these "sentinels" are the ones most apt to note the approach of enemies and give the alarm. That this posting of sentinels is premeditated is open to question. Probably the real reason some crows are on high perches is because at that particular moment they're not hungry. Just as some human beings go to lunch at 11:15 and others at 12:45, so too do crows vary in their feeding time.

Some experiments indicate that the crow has earned his reputation for brains. Charles Arthur Coburn found that a crow could quickly learn to distinguish the difference between doors in the forms of triangles, circles, hexagons, or squares. A pet crow of mine soon solved the problem

*THE CROW is the Phi Beta Kappa of the bird world, but he has one great weakness; he talks too much. The hunter must first conceal himself from the crow's sharp eyes; they are estimated to be three times as good as man's. A clump of bushes, corn shocks or a pile of leaves make a good blind. Then several long "caws" are given on the crow call. Always willing to start a conversation with a stranger, the crows will answer. Then by opening and closing the hand, a series of raucous squawks are produced to bring the crows into shooting range. The calling can be repeated for each new flight of crows.*

of how to open a simple hook and eye fastener to get out of a cage. Their ability to mimic man in being able to laugh and say such words as "hello", "mamma", and "goodbye", seems to lend great weight to the belief that they have a superior avian brain.

One of my pet crows, "Satan", was fond of perching on my niece's shoulder when she was a tot about four years old; here he helped her devour the biggest ice cream cones I could buy. The two would sit down solemnly on a step. First the little girl would take a lick and then the crow would ram his beak into the ice cream. Satan could consume ice cream three times as fast as my niece. This crow also led our dog a dog's life. He stole his food and teased him unmercifully when he tried to sleep. Finally he evicted the dog from his house. The dog house in time became the crow's store room for items which he picked up about our home. When the bird finally died we found a horde of coins, nails, pencils and other objects hidden inside.

I do not believe that the crow is *intelligent* in the sense that man is—that the bird has a moral or spiritual judgment. It is ridiculous to assume that a crow destroys crops, baby chicks, or poultry wantonly, that the bird is cowardly, or that the species as a whole carries on a systematic program to annoy mankind.

But certainly the crow is very adaptable, probably more so than any other of the thousand or so species of birds native to North America. It seems to matter little what man does to a farm; it always seems just right to support crows, even if it will not maintain a crop of grain, an orchard, a herd, or even weeds.

### Do Crows Go South?

Banding operations carried on by co-operators with the U. S. Fish & Wildlife Service have proved conclusively that crows frequently migrate as much as a thousand miles from breeding grounds to winter homes and vice versa. Thus one crow shot at Meadow Lake, Saskatchewan which had been ringed in Oklahoma had travelled about 1400 miles while migrating from nesting to wintering grounds. Another individual banded at Beaverhills Lake, Alberta, was found dead at Celeste, Texas. Migrant crows move by daylight (unlike many other species of landbirds which travel at night) and flocks of them may be noted moving northward from March through April. The return to the wintering grounds is usually accomplished during October and November.

### He Loves to Eat, Anything

Crows range in varying abundance north to Alaska, as far east as the Atlantic Coast of Newfoundland, south through Florida, and west to the shores of the Pacific. Their nests may be found throughout this vast territory in shrubs, atop chimneys, inside hollow stumps, on the very ground, or in a tree fork more than a hundred feet above the earth. They are at home in palmetto thickets, cypress swamps, rich farmlands, arid desserts, city parks, lush marshes, pine-clad mountains, or grassy prairies. At least six hundred and fifty different items have been identified in the food they eat, including such diversified items as snakes, salamanders, wireworms, grasshoppers, sparrow eggs, dead seals, young gulls, rotten fish, figs, star-nosed moles, poison ivy seeds, and crawfish.

Because of their resourcefulness in adapting themselves to varying habitats; in being able to eat whatever foods are available; and in maintaining their numbers continuously despite man, the crow

TO FEED five noisy nestlings like these the old crows will have to scour the fields for insects from dawn until dusk. Naturalists have found that up to 500 grasshoppers will be fed to five young birds in a period of a few hours. The farmer who has had a corn planting ruined by crows may have different ideas on their eating habits, and conclude that they eat their insects on another farm.

**NO CROW HUNTER** is down-hearted if he comes home empty-handed, for the crow is no ordinary adversary. Most hunters will use decoys, such as stuffed owls, imitation crows, or even a cat on a leash. The best crow drawing card is still a live Great Horned Owl. Crows will come for miles to dive-bomb their ancient enemy. Once they are mad their judgment is lost and they become easy targets.

is a raucous success. Such species as passenger pigeons, ivory-billed woodpeckers, great auks, heath hens, Labrador ducks, and Carolina paroquets which could not adapt themselves to changing conditions and environment have, by contrast, paid the extreme penalty of near or complete extermination.

The dietary habits of crows which should determine their status as pests or assets, have been the subject of more than a score of investigations, of which two, namely, Farmer's Bulletin No. 1102: The Crow in Relation to Agriculture, and U. S. Department of Agriculture Circular No. 443: Crow-waterfowl Relationships, both by E. R. Kalmbach, Senior Biologist, Fish & Wildlife Service, are particularly noteworthy because of the unbiased manner in which they were compiled.

The basis for the Farmer's Bulletin was the contents of 2118 crow stomachs collected in all seasons from forty states, the district of Columbia, and several Canadian provinces. Thirteen hundred and forty stomachs were from adult crows, and 778 from nestlings. This liberal sample revealed that approximately 28% of the yearly food of crows consists of animal matter, and the remainder, or about 72%, is vegetable matter.

### Insects Are the Usual Entree

About one-fifth of the crow's yearly food, as shown by the examination of stomachs, is composed of insects, and these include such highly destructive types as May beetles and their larvae, caterpillars of many kinds, grasshoppers, and weevils. Crows are not particularly selective in their feeding on insects and some kinds which may be of value to agriculture are also eaten. The studies show these to be only a fraction of their year 'round diet

As examples of typical crow meals in which pests played an important part, Kalmbach mentions one crow's stomach which contained remains of 85 May beetles; another, 72 wire worms; and in a third fragments of 123 grasshoppers. One particularly hungry crow, secured in Michigan, had eaten 483 small caterpillars, and a series of 12 birds shot in Manitoba each contained an average of 57 grasshoppers. Eleven nestling crows comprising two broods had consumed 1003 grasshoppers within a few hours before they were collected for the investigation.

Among the other foods which make up the 28% of the animal matter in the crow's yearly diet are such things as small mammals, including young cottontails and mice. Eggs of poultry and wild birds, spiders, and carrion are also items in this category. The eggs and young of poultry and wild birds comprise at most 2.5% of the diet. In the past few years there have been many complaints from sportsmen about the destructiveness of crows to the eggs and young of upland game birds, such as pheasant and bobwhite. Their claims do not stand up however when one considers that the 2½% mentioned above includes these game fowl as well as a host of other birds.

There have been instances, however, where crows, because of their fondness for eggs, have been a controlling factor in the lives of other birds in restricted areas. Rollin H. Baker of the Texas Cooperative Wildlife Research Unit, College Station, Texas, found that a colony of some 1500 egrets and 3000 snowy egrets in Waller County had their clutches destroyed by crows. And a two-year study of crow waterfowl relationship by the U. S. Fish & Wildlife Service in limited areas in Saskatchewan and Alberta revealed that crows destroyed 31% of 512 wild duck nests under observation. But by contrast, crows damaged only 2.6% of 917 nests under observation on the Lower Souris Refuge in North Dakota. Varying numbers of crows over any given area and varying amounts of other food available to them will account for this contrast in their damage to other wildlife.

The carrion eating habits of the crow are additional evidence of its ability to

(Continued on page 98)

THE WHITE EAR at the right comes from a hybrid that is equal in both yield and standing quality to the yellow hybrid beside it. The yellow is better livestock feed.

# WHITE CORN

BY ROBERT R. JOHNSON

*White Corn was once the most popular corn on American farms. Later it gave way to yellow. Now with hybrid seed and higher prices the white grain is attracting new growers.*

FIFTY years ago farmers determined the color of the field corn they planted by the color of seed left in the grain bin from last year's crop. If it was white, it didn't matter, for white was believed as good as yellow for the livestock and even better for the family table. There was a commonly accepted belief that white corn out-yielded yellow.

In 1920 Dr. Steenboch, a Wisconsin scientist, learned that white corn lacked certain food values when compared to its yellow cousin. Because it has no carotene content, white corn lacks Vitamin A.

Since then the white grain has slid in popularity. There was one other setback in the story of white corn.

When hybrid corns were first developed, the men developing them concentrated their attention on the yellow varieties. They were slow to develop white hybrids, and farmers who raised white field corn were still planting open pollinated varieties while their neighbors began to get greater yields with the new hybrid yellows. Previously, white corn held its own in bushels per acre. In some areas it produced better than open pollinated yellow corn.

GROWING WHITE corn is no different than growing yellow. The difference comes to light when the grain reaches the elevator and the check is written. Of 90 million acres of corn grown annually in the United States, only 12 per cent is white.

But there was no denying certain industrial and table uses for which yellow could not substitute. In the middle 30's the processing companies who depend on white corn became alarmed and started paying higher premiums for it. Today white corn still brings a higher premium in the fall over yellow, but by planting time the premium for white has usually disappeared. If a farmer has white seed on order he may try to change his order to yellow because he sees no chance of a premium in the fall. Year after year, however, the premium has reappeared, and the farmer who follows the markets proceeds to plant his white corn, secure in his knowledge that the premium will return in the fall.

In the summer of 1947 the premium for white corn over yellow was from 30 to 40 cents per bushel for corn of the same grade. These high premiums are out of line with what can be expected over a long period of time. Farmers can expect, for some time to come, a premium of 10 to 15 cents a bushel for white field corn. Since 1934 there has been a premium of at least six cents a bushel and often three to five times as much as that amount.

During the war, OPA had a 15 cent ceiling on this difference. The American Corn Miller's Association, which is fostering a "grow-more-white-corn" program, sees no early collapse for the white corn premium. Farmers can expect to get a profitable cash advantage for several years to come if they produce good white corn. As the development of white hybrid seed catches up to yellow, middle-western farmers are giving it greater acreage and reaping the added profits.

There is an annual demand for 150,000,000 bushels of white corn. In 1946 12 per cent of the corn crop was white, while in 1917, 41 per cent of all corn we sent to market was of white varieties.

### Where To Plant White Corn

White or yellow corn has the same soil requirements. But there is the practical matter of selecting a field far enough from yellow or other corn to keep them from mixing when late summer breezes begin to fill the air with pollen. White corn should be isolated from yellow by at least 200 yards. If they are planted closer together the two colors may mix in the first few rows.

When planning your white corn crop, you should take into consideration the neighbor's corn fields as well as your own for the pollen won't stop at the line fence.

### Where It Is Grown

Although some white corn is grown in every state, the bulk of it is grown in two main areas. Half of all the white corn grown in this country in 1946 came from a group of southern states which includes Kentucky, Tennessee, Georgia, North Carolina, Alabama, Mississippi, and South Carolina. Another 20 per cent of the total was produced by the corn belt states of Illinois, Nebraska, South Dakota, Missouri, Minnesota, and Kansas, listed in the order of their importance. Iowa, the tall corn state, came through with only one per cent of the total white corn. Millers would like to see more of the nation's white corn come from the heart of the corn belt because it is closer to the processors and would cut freight costs. Thirty years ago the corn belt states led the country in white corn produced. Then livestock growers cut

ON LARGE cash grain farms the premium for white corn is a major item on the farm records. For smaller acreages the margin of profit over yellow corn is often too small to warrant the segregation and extra marketing care that the white demands.

out the white and planted yellow and the bulk of production shifted to the South where white corn is still used for more table dishes than in any other part of the country.

Farmers in the very northern part of the corn belt have trouble finding white corn hybrids suitable for their localities. Corn breeders are busy developing varieties of earlier maturity, however, the same as they did for yellow corn. There are now good white hybrids for most of the corn belt. It is a matter of a few years until every section will have a suitable white seed. Farmers who can isolate it from yellow corn can make it a profitable cash crop. Those who grow corn for feed should stick to yellow.

### How To Get The Seed

The best way to choose the correct white hybrid for your farm is to contact the county agent, the local seed dealer, or your state experiment station.

White hybrid seed is somewhat more expensive than yellow. Throughout the country this difference will probably average close to a dollar a bushel more for the white. In some sections there is no difference, while in others it may go as high as two dollars. G. H. Dungan, Professor of Crop Production, University of Illinois, says, "Because of the necessity of extra work and pains to maintain purity in the production of white hybrid seed, growers usually charge a little more for white than for yellow seed corn. The larger price does not amount to much on an acre basis, however."

### As A Feed

If the outlook for white corn on the cash grain market is good at planting time but for some reason the picture changes by harvest-time, the crop is still not a total loss. If the premium should disappear or the corn be too high in moisture content, it can still be fed to the stock. White corn is a poor livestock feed compared to yellow, but white can still be used in the right combination with other feeds. Well-cured hay can supply the necessary vitamins. While yellow corn has greater Vitamin A content than white, it still contains only one-tenth the Vitamin A of a well-cured hay.

Tests by F. B. Morrison at the Wisconsin Agricultural Experiment Station have shown that pigs not on pasture lose that healthy look when fed white corn for a long period of time. On the other hand, the farmer can supply the Vitamin A by feeding some leafy legume hay that has retained its green color.

White corn is a good poultry feed for finishing off the birds if you want their skins to have a light color rather than deep yellow when sent to market.

Glen Feddler, a southern Ohio Dairy farmer, bears no love for white corn as a feed. "Wouldn't have it on the place," he says, "if the only way I could use it was to feed the stock. Now for silage that's a different story. Nothing the matter with white corn for the silo. It grows tall and puts on big ears."

### There'll Always Be A White Corn

There are more than 500 uses for corn in human, livestock, and industrial foods or products. Of these, white corn is essential in about a dozen cases.

*Corn flakes.* Only white corn grits can be satisfactorily rolled, flavored, and toasted into America's popular breakfast food. Flakes made from yellow corn may become rancid in storage and all the cream and sugar on the breakfast table won't hide their strong flavor.

*Hominy grits.* Hominy is the starch of the South where it is often used in place of potatoes. Millers want hominy corn that is white and has a broad, square kernel.

*Corebinder.* Foundries utilize tons of white corn as corebinder. It also serves in the facing mixtures of all castings.

*Baby foods.* White corn is included in the nation's infant diets as white corn flour and fine white corn meal.

*Soap makers.* Powdered industrial hand soaps include corn cones because they are non-irritating abrasives.

*Hominy feed.* This popular livestock feed is a by-product of the white corn milling industry.

*Bakers.* White corn cones are dusted on hearth bread, rolls, and other pastries before they leave the bakeries for dinner tables.

*Wallboard gypsum.* White corn paste, be-

"YELLER CORN bread ain't fit for eatin'." This old couple place the white seed in their Arkansas land each summer and hope for enough corn to carry them through the winter. They probably don't realize that white corn brings a premium, but they do know that it makes better homing grits. The mule is not so particular.

cause it lacks color, is an ingredient of gypsum board, wallboard, and as the adhesive paste for wall papers.

*Sausage binder.* When white corn products are used in manufacturing casings for meat loaves and sausages they absorb fats and moisture, hold flavor, and reduce crumbling.

*Explosives.* High grade blasting dynamites and some special explosives contain corn flakes, flour, and paste.

*Pancake flour.* White corn flour and meal finds its way into most of the popular brands of flapjack flour.

*Brewing.* Brewers want white corn rather than yellow when they start a new batch of beer.

*Corn meal.* In the South where corn bread has its greatest popularity, yellow corn meal is considered hardly worth mixing. This is a preference determined, however, by birthplace as much as taste.

If corn millers are to stay in business, they must secure adequate stock of white corn every year. They are the force behind the effort to pay premium prices and to check its downward trend on American farms.

### Marketing White Corn

In sections of the country where most of the corn grown is white varieties, farmers have no trouble marketing their product. In major yellow corn sections, however, where a farmer comes up with half a carload of white, and his is the only white corn sent to the local elevator, he may wish that he had planted yellow.

### The Faults

Elevator operators dislike to accept white corn in less than carload lots, for it must be kept separate in the bins, handled separately and shipped unmixed with ears of yellow. If a farmer in a locality which grows but little white corn decides to plant some and take advantage of the higher selling price, it might be wise for him to first seek out the local elevator operator and ask if the corn will be accepted. If one farmer cannot grow enough white corn to find a ready sale for it, he might meet with neighboring farmers and together they can plan to grow enough white corn to demand a market. Generally speaking there is little difficulty in marketing white corn. It is the isolated cases where the farmer has trouble selling his harvest that tends to sour him on the crop. Isolated growers can, however, often afford to haul their white grain farther to an elevator than they could yellow corn and still make a profit because of the premium.

Farmers have had good reasons to plant yellow corn instead of white. Only in recent years have white hybrids been developed and produced in quantities sufficient to meet farmers' demands even in the major white corn sections of the country. E. J. Kinney, Head of the Department of Agronomy at the University of Kentucky, says, "Kentucky used to raise far more white corn than yellow corn. There was a great change over to yellow corn. I suspect that 75 per cent of the corn now grown in the state is yellow. Yellow hybrids stood up better."

In addition to the fact that white hybrids were developed later than yellow, there is the discouraging fact that, in most instances, white hybrids lodge more than yellow ones. Corn breeders are solving this problem, however, and promise white hybrids that will stand up as well as yellow under every test. There are already white varieties that are entirely satisfactory in their sections of the corn belt, both in yield and resistence to corn borer and disease.

The greatest disadvantage of white corn is the tendency to mix with yellow in the field. Mixed corn will sell at prices lower

(Continued on page 97)

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## BLUEBERRIES

(Continued from page 83)

loose fruit buds, and there are fewer fruit buds formed, all of which cuts down the crop the following year. The farmer with a sharp eye can tell when the plants are fertilizer hungry by inspecting the leaves. The lack of nitrogen gives the leaves a pale yellowish tinge. The proportion of short branches also increases. These symptoms of blueberry sickness are not always the result of poor fertilization; they can be caused by unfavorable soil, pruning, moisture conditions and weed growth.

After adding fertilizer cultivate shallowly and hand rake the soil close to the plants. The aim in fertilizing blueberries is to keep the plants growing vigorously during the berry development and the weeks following when the new wood and the next year's buds are forming. An unfertilized bush may get off to a good start but slow down in a year or two under the multiple burden of growing blossoms, leaf and new wood. This bush will continue to produce some fruit but the growth of the bush will be stunted and the following years will bring only small crops of fruit.

The best commercial fertilizer for most blueberry land is 8-8-8. One ton of a fertilizer that is also good can be made by mixing 300 pounds nitrate of soda, with 300 pounds calcium nitrate, 650 pounds tankage (7 per cent nitrogen), 450 pounds rock phosphate, and 300 pounds sulfate of potash. The tankage spreads the value of the nitrogen over more of the season.

Soil, low in humus, often needs peat more than fertilizer. On the sandy fields trenching in a bushel or more of peat for each plant often corrects the poor growth. The county agricultural agent has the answers to the specific fertilizer questions for his county.

### Pruning

It costs from $100 to $150 a year to keep an acre of blueberries pruned properly if the labor must be hired for the job. Pruning is important because the berries grow on the previous season's wood and some of the old wood must be cut out to get a good crop of new vigorous shoots. Cutting away the old wood allows the bush to produce bigger berries.

Usually the plants need but little pruning the first three years, but after the third season pruning becomes a regular annual chore. The first step in pruning is to cut out the branches that spread close to the ground leaving only the erect shoots. Next, if the center of the bush is dense it should be thinned. The third step is to remove the slender weak branches leaving good healthy wood, for if the slender branches have buds at all they may produce only small fruit. A blueberry bush that is poorly trimmed may get so thick that the picker has trouble getting his hand through it to reach the berries that grow in the center. Pruning may be done any time from early autumn until growth starts again in the spring. Some varieties grow heavier bushes and

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require more thinning than others. Stanley, Concord and Rubel require but little pruning while Cabot and Pioneer should be cut back to about three fruit buds per shoot. "Each of those fruit buds," remarked Spelman as he pulled a high Rancocas shoot down for inspection, "mean about 15 berries next summer. Now on this twig there are 13 buds, that means 195 berries. Next year's going to be a good year all right."

### Harvest

When the blueberries start to ripen the grower is in for his busiest season. He has to supervise the picking, grading and packing, see that his pickers are cared for and his berries shipped at the right time.

To Spelman's farm come migrant workers from the southern part of the country and from Mexico. He has some cabins built for them and expects to build better ones for admittedly those he has are not midget palaces. His crop starts to come on the first part of July and lasts for two months. The pickers pick directly into pint baskets that they carry in trays. A good picker can harvest close to a hundred pints a day, and everyone in the migrant families works in the fields to add to the family income.

Most growers have several packing houses scattered around their farms. The pickers take their berries to these houses, get credit for them, reload their trays and head back to the row on which they are working. Spelman, however, has four decked trailers circulating around the field. The pickers set their full trays on the trailers. When a trailer is full it goes to the central packing house. Spelman got this idea from New Jersey where he saw it in use. He is the only Michigan farmer who employs trailers and he is sold on the plan. "Guess none of my neighbors think much of it though," he grins. "Not one of them has copied it yet."

Once in the packing house the pint baskets of berries are rounded out with as many berries as they will hold and the top is covered with a square of cellophane held down by a rubber band. Packers work piece work and usually get a half cent a pint for capping the baskets. Berries for canneries are packed in wooden boxes, and for the quick freeze industry are packed in large cans.

Wild blueberries, especially the low bush varieties, are harvested with a scoop that has teeth along the front edge. The berries are then passed over a belt while a fan cleans them. They roll off the edge into the pint baskets ready for capping and shipment by truck or rail to markets. Blueberries are a perishable fruit that should get a trip to market soon after they are picked.

They are graded by eye as they are packed. This is the universal method but admittedly not too reliable. When there is some doubt about the grade of a box of berries the packer fills a measuring cup and counts the berries. The number of berries a cup will hold tells him the grade.

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Several attempts have been made to invent a mechanical grader to speed up the job and do it more reliably. Spelman spent all of last winter constructing one that he thinks will work. He was telling Harry Wakeman about the embryo machine. After a full explanation of the principles involved he said, "Don't see why it wouldn't work."

Wakeman was dubious. "It'll probably work all right but I wonder if it will be economically worthwhile. You'll get little more for your berries and it'll cost more to grade them. It just makes things more complicated," he said, "but I suppose it will work."

"Sure, it'll work, Harry," Spelman said. "And if it does I'll come over and sell you one, for I'm going to have it patented. And if it doesn't work maybe I'll come over and borrow some money from you." The problem in a mechanical grader is to get one that won't roll the berries and rub off the pale dust that gives them their color.

### Pests of Blueberries

Insects that feast on blueberry bushes are usually the same kind that attack other common shrubs in the community. Rose bug, Japanese beetle, Putnam scale, fall web worm and tent caterpillar will work on the bush if they get the chance. In some parts of the country the blueberry fruit fly and the cranberry fruit worm also become a nuisance. Control measures for these pests vary with the insect and the location. The county agent will have the information a grower needs for his section of the country.

Birds feed on blueberries and often make pests of themselves when the fruit ripens.

The large commercial blueberry growers are using airplanes now to dust their bushes. In Michigan, and other major blueberry sections, the blueberry associations arrange for dusting, tell the farmer when his fields will be covered and hire planes to do the job. This service usually costs about $1.25 an acre for the plane and pilot plus the cost of materials. Spelman is pretty well satisfied with the air dusting that has been done on his fields. "This year," he said, "they came a little late for some of us, but last year they put the dust where it belonged and at the right time."

### To Market

Growers who have small plots of blueberries in areas where blueberries are not a major crop usually sell their crop through local stores or along the road at the farm stand. One Massachusetts grower received $1.25 a quart for some early ones at his roadside stand last year and many average 90 cents a quart when they sell directly to consumers. Such prices, however, are higher than most growers ever realize. The growers harvesting several acres usually market their crops through a cooperative association. The Blueberry Cooperative Association, New Lisbon, New Jersey, including in its membership a majority of the growers in New Jersey, Michigan and North Carolina, handled 600,000 crates of berries last summer. These berries are packed and sold under the trade name of Tru-Blue-Berries in three grades according to size. The grades for Michigan are Superior, Golden Moon and Columbia. For New Jersey, they are Harvest Moon and Pine Tree. Berries below Tru-Blue grades are sold under Lake State Brand in Michigan and under Green Leaf Brand in New Jersey. Growers who belong to the Blueberry Cooperative must market their crop through the cooperative which distributes the crop over a large area and tries not to flood one city with the fruit.

The three major outlets for blueberries are packed berries for commission houses, canners and frozen food packers. When one is overstocked on fruit, another can usually make use of the excess, thus helping the growers avoid a surplus.

There is no standard price on fresh blueberries as there is on grains. The price varies from week to week and city to city. Many of the Michigan berries went for 26 to 30 cents a pint wholesale last summer and the growers consider this a fair price. The associations ship berries on consignment and the growers get their checks after the berries are sold.


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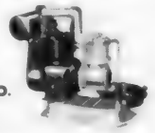

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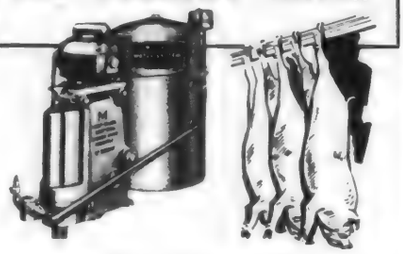

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The cost of starting an acre of blueberries is high. The plants will cost close to $300 if two-year-old stock is purchased. Add to this the cost of preparing the land, the cost of fertilizer for the first year and the price of any peat that the soil needs.

Once the crop is in full production, an acre of berries, at present prices, should bring in $1,500 a year. This is not all profit. If you belong to a marketing association, as most successful growers do, you will have to contribute 10% for selling. Transportation may cost 15 cents a case. Picking will cost 90 cents a case, packing 10 cents, and the cases and baskets will likely come to another 40 cents. The percentage of profit will vary from year to year with differences in both prices and cost of production.

Other annual costs that must be subtracted to get the year's profits are fertilization, pruning and dusting or spraying, and addition of peat or other soil treatments. The high cost of establishing a planting is one of the major arguments against growing them.

Not all blueberries are grown in the large commercial plantations. A few blueberries around the home place have supplied fruit for delicious pies and muffins for decades and it is through these small plantations that the blueberry still maintains much of its popularity. A half dozen bushes along a back fence where the soil and moisture are suitable can supply the family with fruit that comes on year after year. If you have no land suitable for big blueberry plantations, but would still like a few plants for the home place they will grow if the land is made suitable with acid mulches, fertilizer and watering.

Charles Falconer of Concord, New Hampshire, makes his 18 blueberry plants serve a dual purpose. He sells the yearly crop to neighbors, and throughout the year the bushes are a hedge that add beauty to the place. Falconer calls this his "Scotch hedge." It gets an annual mulch of sawdust and oak leaf humus.

Within the past few years the blueberry business has attracted new growers wherever the berry can do well. "There's going to be too many of them," says Spelman. "Everyone is getting in and I can't see what we're going to do with all the berries. Guess we'll have to rely on growing the new fancy varieties that bring the high prices. Yes, it's going to be overdone but what good thing isn't? Too many gas stations, too many grocery stores, too many churches and I sometimes think there are too many farmers. Price of blueberries will drop," he continued, "and eventually it will come to a great extent to be a canning and quick freezing proposition."

"As production increases farmers will have to build cabins for pickers," Spelman is smiling now and obviously stretching a point, "and advertise in papers 'Six weeks vacation with pay. Picking blueberries, free cabin, free open air movie every Friday night, free Lake Michigan for bathing,


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## WHITE CORN

(Continued from page 91)

than those paid for either white or yellow. White corn must be at least 98 per cent white when sent to market. Yellow corn will pass if it is 95 per cent pure. A little care in selecting the white corn fields, however, will enable a farmer to produce pure white corn with little risk of mixing.

White corn has been the main crop on the George L. Davis farm along the Scioto River in southern Ohio for the last 100 years. "We grow white here," he said, "because we get more money for it." He harvests about 50,000 bushels a year.

One thousand acres of this 3,000-acre farm goes into white corn each year. Buyers from Kentucky come to the farm in the autumn and purchase the grain. "We never have trouble marketing our corn," Davis says. "The buyers always send trucks right to the farm for it."

His farm includes one 92-acre field, called the Sycamore Field, which has grown corn every year for the past 90 years without being fertilized. This is river bottom land and periodic floods enrich it.

There has been a hybrid white seed available for this river bottom land for only two years. It is still not too plentiful and sells for around two dollars more a bushel than yellow. Since it became available Davis has planted it exclusively because of the higher yields it gives and because the stalks stand up in the field better than open pollinated.

He also manages a herd of 150 dairy cows. Davis, like most farmers, considers white corn inferior to yellow for livestock feed. He plants some yellow corn for feed next to the white. "The first few rows will mix," he says, "but rather than plant in separate fields, we just feed that along with the yellow. We usually plant our yellow corn on the ground we want to sow in wheat," he adds, "for it matures about two weeks earlier than the white, and gives us time to prepare the seedbed for wheat." The future for white corn looks good to Davis. Other corn belt farmers are beginning to include it in their plans now that the premium is high and new hybrids make it suitable for most corn producing sections of the Midwest.

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## CROWS

(Continued from page 87)

adapt itself to varying conditions. As a year 'round food, carrion also furnishes about 2½% of the diet, yet in January when food is scarce carrion accounts for almost 9% of the crow's menu. Much of this carrion results from highway deaths of cottontails, pheasants, muskrat, skunks, and dogs. It is a common sight on a cold winter's day to see a group of three or four crows gathered about some carcass along the road. By contrast it is a rare sight to see a dead crow along the highway.

The complaint heard most frequently about crows is that they pull up and eat newly sprouted corn. This is true; in the corn country during April and May corn constitutes about 33% of their food. When one considers that a mature crow which weighs about one pound may eat half its weight in food every day, the total consumption of sprouting corn by the enormous crow population in the Midwest must be tremendous. The best cure for this is the use of deterrents made from coal tar, and sold under a variety of "anti-crow" names. The treatment of grain with this inexpensive by-product of the gas industry does involve considerable time during the planting season when hours are short on the farm. But it is less time consuming than trying to shoot or trap crows. Some farmers make a practice of purposely scattering a small amount of corn (not expensive hybrid seed) on their fields during the week or so when sprouting corn is subject to most damage from crows. This bait seems to have the desired effect, for the birds show little interest then in the growing kernels.

Just ten years ago a careful survey of the depredations of crows on the grain, sorghums, and Indian corn crops of Grady County, Oklahoma, was made by government officials. In this county of about 1100 square miles it was found that the loss to the farmers of the entire county amounted to $18,370.00. This is one of the very few instances in which losses from crows has been figured out on a dollar basis. Unfortunately, no one made a comparable survey in that county to give us an estimate of the benefits, if any, man received from crows.

Aside from grains, other crops which are subject to damage include watermelons, peanuts, oranges, and cherries, but on the whole, the losses are insignificant. Wild fruits and nuts, including bayberries, hackberries, wild cherries, and acorns comprise about 14% of the adult crow's sustenance.

For a bird that is accused of so many vices the crow must still be credited with a fine sense of originality. One bitterly cold January day when the Ohio River was chocked with ice floes I noticed a number of crows were having a gay time


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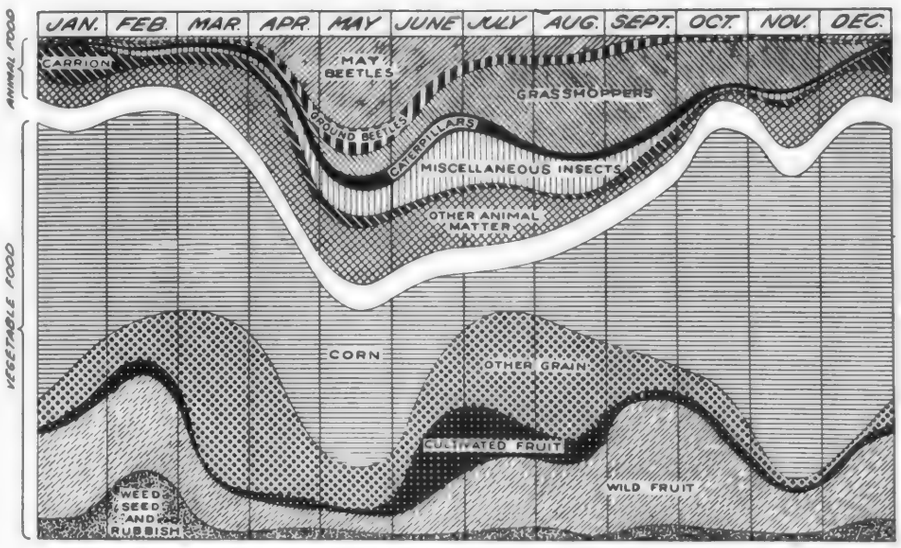


THE CROW'S eating habits throughout the year as recorded by the U. S. Wildlife Service from examination of thousands of crow's stomachs.

riding down stream on ice pans. A bird would alight on a chunk of ice, drift downstream for half a mile or so, then fly back upstream to repeat the performance. While riding, some of the characters would walk back and forth on their icy rafts like a nervous admiral pacing the bridge of his flagship. On one such journey a gull and a crow were fellow officers and they divided their lookout duties.

Crows, except during the nesting season, are gregarious. After the young ones are all out of the nest, flocks ranging from half a dozen to more than a thousand may be seen in fall and winter at some favorite feeding, drinking or bathing site. Great hordes of them are frequently noted in a harvested corn and wheat field late in winter, gleaning for waste grain. At this same season the birds gather into tremendous roosts which sometimes number over 100,000 birds.


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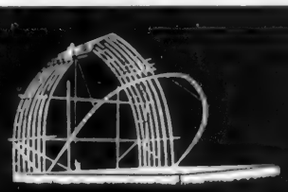

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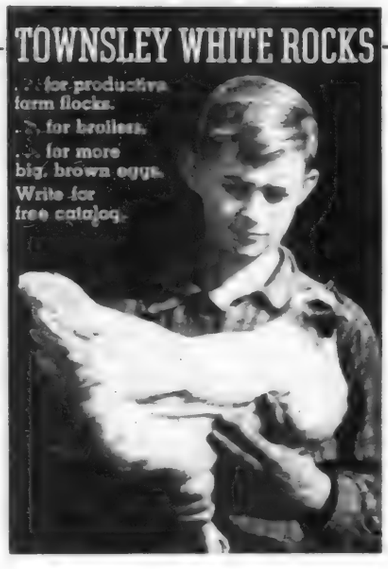


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### Wholesale Control Measures

Efforts have been made to control crow populations in sections where proof or assumption (which is frequently wrong) indicates that the birds are doing damage. In large scale control programs the work should be in the hands of competent agents lest more harm than good be done. Control measures include trapping, poisoning, and bombing of roosts. The latter method is the most spectacular and the most efficient. Sticks of dynamite placed in cans filled with scrap iron are hung up in the branches of groves where crows roost. Late at night, the dynamite sticks are exploded simultaneously by an electric charge. According to Dr. Walter P. Taylor, 60 such bombs were set off in a roost in Collingsworth County, Texas, on the night of April 7, 1937, and the next day it was estimated that 40,000 crows had died from the blast. Two years later in December, 26,000 were killed by bombing a roost near Dempsey, Oklahoma. During 1939-40 the Illinois State Department of Conservation bombed a number of roosts near Rockford, Illinois, and reported that 328,000 crows were eliminated in this operation.

Crow hunting with a rifle or shotgun has always been a popular sport, but it is doubtful if it has had any effect on the overall populations.

How do the crow control people operate? Can they be employed? Big scale crow control programs are carried on by either state or federal employees. A letter to the U. S. Fish & Wildlife Service or the State Department of Fish and Game will usually bring an extermination crew, if one is available, to an area heavily infested and ravaged by crows.

Some of the crows that have been killed have been used as food, and as such, if for no other reason, their destruction was justified. Crow meat, unfortunately, is dark in color, and for that reason most people have an aversion to it. Others are prejudiced because they think a crow is unclean. Their feeding habits, compared to those of a bob-white, or a mallard or woodcock—all highly prized game birds—are beyond reproach insofar as the effect on the taste of the meat is concerned. The taste is good; I speak from experience. During the late 30's and early 40's crow meat was sold on markets in some of the middle western cities. Sales were occasionally increased by selling crows as "rooks." Fifteen to twenty cents was about the average price.

The inter-relationships of animals in a wildlife community are so complex that so far very little is known as to exactly what extent one species affects another. In such a community where man is one of the dominant factors it becomes even more difficult to analyze the value of any given species. Thus, while crows might eat many dollars worth of poultry, corn, apples or figs, they might also devour and control pests which would cause a corre-

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sponding or even greater loss to these same crops. However, if 1,000 crows decide to take the debit side of their diet out *your* corn field, you can't balance that with the fact that they eat the other fellows insects.

Until sufficient research and investigation has been carried on throughout the crow's entire range it might be well to treat the species with a little more respect and tolerance than has been extended to it in the past. From research work already done on the food habits of the species, the dietary habits of the crow seem to be on the credit side rather than the debit side.

## THE POLLED BLACKS

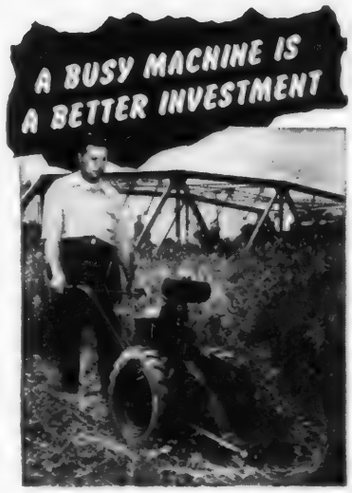
(Continued from page 57)

cattle will be a statement about like this, "they are wild and hard to handle." It is true that an Angus cow with a calf is difficult for a stranger to approach. Shyness and a protective instinct which causes an animal to turn tail and run is characteristic of most animals without horns. A goat which has been the barnyard hazard whenever a person's back was turned will usually change into a docile, shy animal when his horns are removed. Angus owners say that this shyness which strangers often mistake for wildness is the price you pay for not having horns to bother with.

The beef cattle men at Midwest agricultural colleges have certain reservations about each of the beef breeds. With the Angus they are usually critical about the rate of gain that is made on the range. To make this point they'll say that in the range country Angus usually do not weigh as much at any given age as other beef breeds. In the pasture states this does not hold true. They will say, too, that they tend toward nervousness, and that the handling methods should be aimed to keep from frightening them. L. Alan McGregor, the manager of Andelot Stock Farms, Worton, Maryland, says: "There is nothing mean in the average Angus bull's nature, but he will fight back if you treat him rough. Continued rough treatment will make any bull mean. I have yet to see a mean Angus bull that had decent treatment. We have our bulls so gentle we can walk up to them in the pasture at any time and under any circumstances," he continued. "By taking visitors in among the herd, petting the herd bull and some of the cows, we quickly knock into a cocked hat the idea that Angus cattle are wild."

A Texan who vouches for the easy handling of Angus cattle on the range is Mac Cauthorn of Sonora. He runs a cow herd of 300 head.

"I can take one man and round up my entire herd without loping a horse," he says. "Or I can climb into my pickup truck with a gallon of cottonseed cake and drive to my herd without scaring them. They will all gather around the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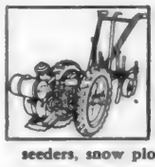

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pickup for the cake, making it easy for me to see every animal."

### The Marbled Beefsteak

The characteristic of well-marbled beef is bred in Angus and not fed into them. The result of carcass contests is a further reason why the packers, in the purchase of carlots of show cattle at the International, often have been willing to pay an average of $1 per hundredweight more for Aberdeen-Angus than for other cattle. The average dressing-out percentage for these cattle has been 65.17 over the period of 47 years that the International has been held.

Just as people are known by the kind of company they keep so cattle are often judged by the kind of masters they select. The breeders' list for Angus cattle contains names of many men who have spent large sums of money building their farms into showplaces for their sleek black cattle. And these men have reaped a good harvest of publicity. But what about the farmer breeder? Can he make money with Angus cattle? Do farmers want Angus bulls for crossbreeding? Down in the Blue Grass section of Kentucky on a hilly little side road off the Winchester-Richmond Pike "Mister Jim" Quisenberry has the answers.

A stocky, active Kentuckian of the circle of breeders of fine horses, cattle and sheep in the Winchester area, J. H. Quisenberry, who is in his early sixties, has seen his Angus make good in shows all over the South and Midwest. In 1947 they went to the International for the first time, and despite the fact that they had the toughest competition the Angus classes have ever seen, the Hill Crest Angus came home with an assortment of ribbons: a 2nd in the Summer Bull Calf Class, a 4th on a Junior Yearling bull, a 2nd on a Pair of Yearlings and money winners in seven other classes. One of the bulls which was shown was liked well enough by Walter Swoope of Columbia, Miss., for him to pay Quisenberry $3500 for him.

These Angus are the product of a grass farming program and ordinary farm handling. There are no fancy barns or buildings on the Quisenberry farm. The best calves and bulls share a barn with the burley tobacco which hangs over their box stalls. And tobacco barns are not tight; there are plenty of cracks which allow the breeze to come through to dry the leaves. The cow herd spends the winter out in pasture; there are movable shelters and feeders but unless the weather is very windy and snowy the cows are out grazing, scattered to every corner of the big rolling fields. They are roughed through the winter on straw and hay and are given just enough grain to keep them thrifty. The cows with calves are kept in another pasture, and they are given a little grain (four or five pounds every day).

Quisenberry got started in the registered Angus business in 1925. "I was forced into it," he recalls. "The county

agents from the mountain counties of eastern Kentucky came down to us and wanted registered Black Angus for breeding up the scrub beef cattle that roamed up and down through the laurel and the red oaks of the mountain sides. I had been raising some good black cattle, but they weren't registered. So I began building a registered herd, and I had a lot of luck in getting good stock. My three boys were in their teens then and they got interested in showing at the fairs in Kentucky. The big event was the Louisville Fat Stock Show in November. The boys won reserve championships for several years and then we got five champions out of seven years showing at Louisville; two my son James won and three were won by other boys with animals we bred. The dam of four of these animals was our herd-builder, 'Julie Girl 4.' One of those reserve champions dressed 70+%, the highest dressing-out percentage recorded at the Fat Stock Show up to that time for beef cattle. And it hasn't been equalled since."

The bulk of Quisenberry's Angus business consists of selling breeding stock to farmers in the South and Midwest. He hasn't advertised much, and hasn't had to. Almost every day a farmer's truck pulls up, out of which emerges a farmer and a friend or two who have come to "look at the black cattle." Bulls and heifers bring $400 to $600 as yearlings. Some fine show animals go up to one or two thousand dollars. "We like to sell them as yearlings," says Quisenberry, "before they eat too much.

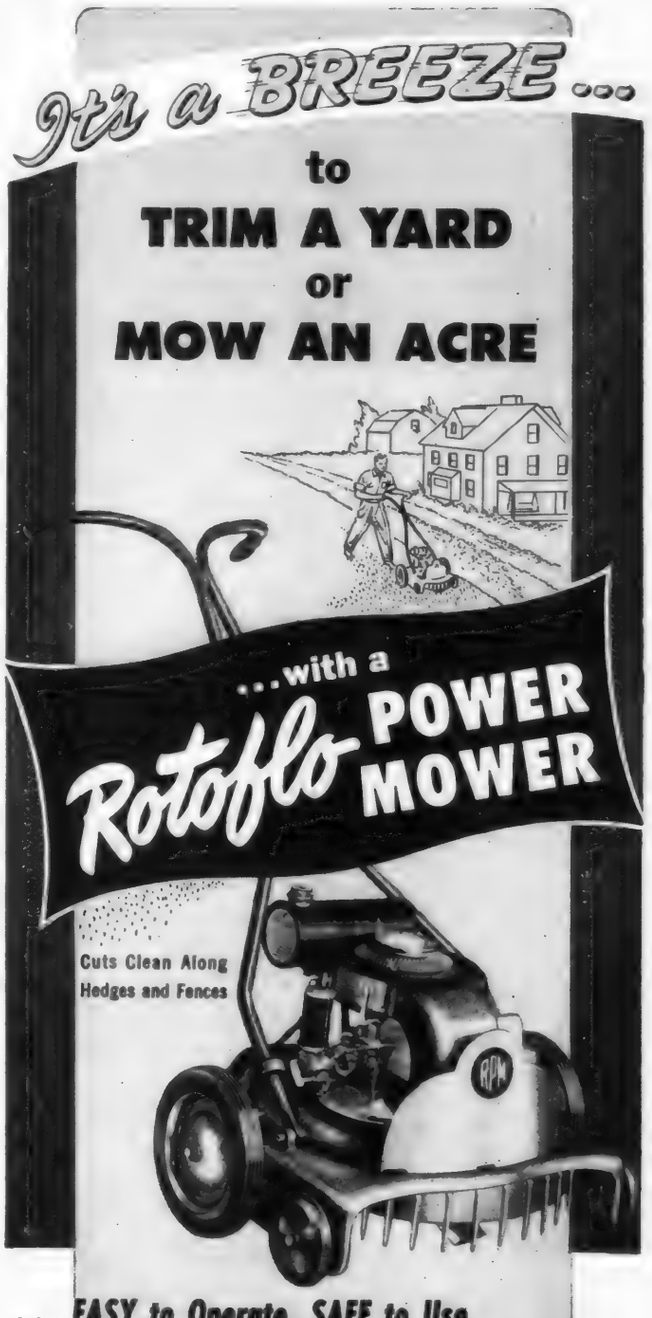
"We don't try to have our cows drop their calves at a particular time of the year," he says, "for our buyers are as likely to drive up on New Year's Day as they are on the first of June. We like to wean our calves about the first of December, when the grass wanes. After the calves are weaned, when they weigh from 350 to 500 pounds, we put them in a separate pasture and keep them growing. They get our best hay in their feeders and they are fed about 1 to 1½ pounds of grain per hundred weight a day. Our grain mixture is home-mixed and consists of eight pounds corn and cobmeal, two pounds barley or oats, one pound bran and one pound soy or linseed meal with salt and minerals added. We ordinarily grow very little corn on the place, unless corn gets scarce and the price is high. Last year we grew 75 acres, this year 40. Next year we plan to raise about 75 acres. When we want to finish a bull or a heifer we work them up to two pounds of grain per hundred weight a day. It's no trouble at all to put 2½ pounds a day on an Angus bull or heifer. We have a few fast gaining calves, of course, like one we sold to a 4-H Club boy several years ago. The calf weighed 250 pounds when he bought him in January. He fed him until the first of November and sold him at 1040 pounds, a gain of 790 pounds in a little under ten months.

The Hill Crest Farm handles 200 Angus over a year's time. Quisenberry and his three sons farm their own 800-acre place and rent about 500 acres more. There are about 100 cows in the herd, 100 young animals and 50 to 60 Angus type feeders are purchased and finished on grass for market each year. There are also about 400 sheep which are managed on the "Blue Grass Lamb" cross-breeding plan, Southdown rams bred to western Hampshire type ewes.

"The way we make money with our Angus cattle," says Quisenberry, "is to let them feed themselves on good pastures. We haul out manure to our pastures, and even though our soil has a limestone base we use 2½ tons of lime per acre every ten years. Our pastures are practically all blue grass and lespedeza.

"We've had other kinds of beef cattle but we never found any we liked as well as the Angus. They are healthy; we've never had any cancer eye, no trouble with pink eye, no bang's disease and the only mastitis was a case in one old cow that a tenant farmer was using for a milk cow. He neglected to milk her for a day or two and half of her udder spoiled.

"Just like any other beef or milk breed," says Quisenberry, "a wild cow will turn up once in a while. There's only one thing to do with her; send her to market. Don't use her for breeding. Our bulls are gentle for they have been treated kindly. We can walk up to any of them in pasture and put a halter over their heads and lead them in."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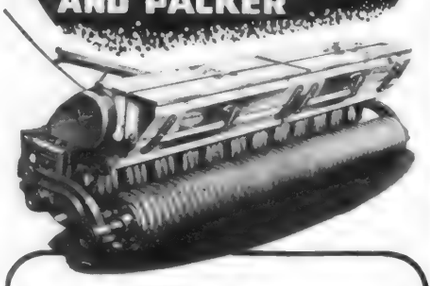

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### The People Back of Angus Cattle

Back of the expansion of the breed is the American Aberdeen-Angus Breeders' Association with headquarters at 7 Dexter Park Avenue in Chicago. The national group was formally organized November 21, 1883, just ten years after the first four Angus bulls docked in this country from their native Scotland. The present secretary is Frank Richards. During 1947 a total of 81,992 Angus were registered in the herdbooks of the association as compared with 74,214 in 1946. Transfers totaled 69,574 as compared with 65,832 the previous year. New breeder-members joining the national group numbered 1668.

During the year there were 199 public auctions of registered Aberdeen-Angus. In these sales 2360 bulls sold for a total of $1,389,420 for an average of $589; 10,075 females sold for $5,141,866 or an average of $510. Bulls and females brought a general average of $526 in these public auctions.

One can almost see the white beard of the great Angus breeder, William McCombie of the county of Aberdeen, bobbing happily up and down at the success his beloved Angus doddies and Buchen humlies have made in America. "Dodded" and "humbled" are the old Scotch names for "polled." It's a blessing though that his Scotsman's heart was spared the shock of hearing of the five figure prices that many of the fine animals have been bringing. It might have been too much for him!

### FISTULAS ARE DYNAMITE

(Continued from page 59)

fence. A saddle horse with a fistula is a sorry sight, and a work horse will usually require a special collar pad.

Dr. W. F. Guard, Chairman of the Department of Veterinary Surgery at Ohio State University, and an outstanding worker in this field reports, "The radical operative procedure I have followed for twenty-five years has been very satisfactory. Reports of owners show that such procedure is entirely satisfactory in approximately 88 per cent of cases operated."

The operation is expensive as the veterinarian must not only apply anesthetic, do the operation with an assistant, but he also should make an almost daily inspection of the incisions on each shoulder to see that they are draining properly. They must be kept open to allow the infection to drain out for at least four weeks. That means that, in any case, the operation will cost $150 to $200. As we can see from Dr. Guard's figures the chances are almost nine to one that the horse will recover, showing no ill effects in gaits, health or disposition. Nor will the operation affect the ability to produce offspring. Blood tests can be run from time to time after the operation to determine when the horse

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has recovered and is completely free of the infection.

For cleaning the stall or infected area from an open fistula the veterinarian will probably recommend a solution of one pound of lye to twenty gallons of boiling water. Cresol compound (U.S.P. 3%) or its germicidal equivalent, in chlorine preparations should be sprayed on all surfaces after they have been washed with lye water. Straw and contaminated bedding should be burned.

Not every cow that is pastured with a horse that has an open fistula will get brucellosis; she would have to eat some of the grass that was covered with the live virus. A cow that had been vaccinated as a calf would probably resist the bacteria in any case. But no farmer would want to expose his herd of cattle or his other horses to this danger. Some states have laws against pasturing horses and ponies with dairy cattle. If farmers don't know about the dangers of spreading brucellosis from opened fistulas, and a very few seem to, this is certainly a sound preventive measure. In any case a swelling of a horse's back or neck should not be considered as "just a bump from going under a low tree."

## PUSH BUTTON FARM

(Continued from page 52)

lot of time. Now the feed is unloaded into a three-ton wagon which is driven along the side of the road. An elevator carries the feed across the berm and into the bunker as the wagon moves along. The cattle are allowed around the bunk only while they are feeding, about thirty minutes. They are then penned out so that they will not loaf around and concentrate manure in the vicinity of the bunk.

The most recent labor saver in the hog department is a home-made machine saving 2½ hours of labor per day distributing buttermilk to all hogs on the farm. In addition to home grown grains and 40 per cent supplement the hogs are fed Semi-Solid Buttermilk supplied by Consolidated Products Company, Danville, Illinois. This buttermilk is delivered in 1200 gallon tank truck loads and pumped into vats in the mow of the hog barn, out of which it is drawn by gravity into a 540 gallon tank mounted on a wagon which carries, besides the tank, a box with two compartments holding farrowing and gestation rations for the sows. The 540 gallon tank is filled with a mixture of water and buttermilk in ratio 1 to 8. A 2 H.P. motor pump, by means of a bypass, mixes the buttermilk and water perfectly and a 30 ft. filling station hose with a nozzle on the end enable a man to drive down the lane between the feed lots and squirt this mixture into a barrel showing gallon markings so that each pig is fed the right amount. The pigs receive this feed as a drink while the sows have their grain mixed with it and eat it as a slop.

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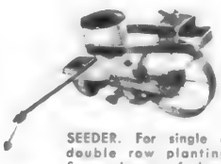

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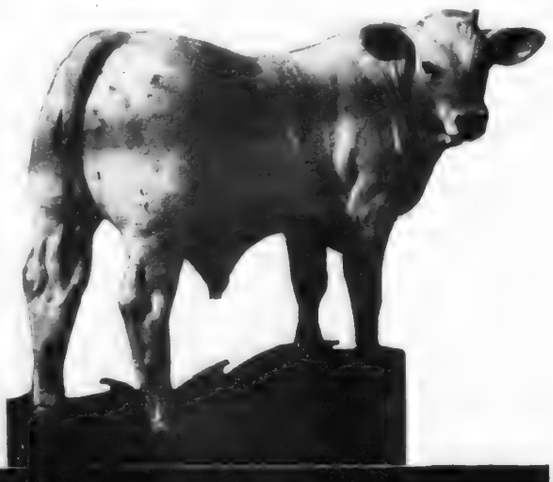

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### Crops

Although the corn crops have increased from 6,000 bushels six years ago, when the breeding of show stock was abandoned, to 22,000 last year, tests show there has been a steady improvement of the soil. A part of the increase resulted from increased yields following a soil-building program, a part from increased acreage. A complete soil type survey of the entire farm was made by C. M. Long of West Lafayette, Indiana, and a program of rotation and soil enrichment was worked out by Long and Bubenzer. Some of the more fertile fields in the river bottom were placed on a two year rotation of corn, oats and sweet clover. Bubenzer believes sweet clover is tops for building up the soil. It is broadcast from an end-gate seeder, 10 pounds to the acre, three weeks after he has planted the oats. Otherwise, in the rich river bottom fields it would grow through the oats at the harvest time and make trouble for the combine. Elsewhere on the farm the rotations vary from three to six years, the latter on thin fields which were acquired recently. The three year rotation is corn, oats, clover; the four and six year rotations are: corn for ensilage or beans, wheat, and two to four years of grass. A few fields which are rolling have wheat and five years of grass, a typical grass program.

Three years ago two poor fields adjoining the north unit were purchased. The best that had been raised on the fields was thirty bushels of corn. The two fields were given plenty of lime and manure. One field was given 1000 lbs. of 0-12-12 to the acre in two years and planted to alfalfa. The next year it produced four tons of alfalfa. On the second field 600 lbs. of 8-8-8 was plowed under and 85 bushels of corn was taken off. The corn was followed by a legume mixture.

Pastures at Conner Prairie are well fertilized and are regarded as crop land and must pay out as the grain fields are expected to do. Permanent pastures are top-dressed annually. Alfalfa is used as long as it produces and by a generous fertilizer program it is kept at a high rate for four or five years.

"We have one field that produced its biggest crop this year, its fourth," said Bubenzer. "I believe we can keep alfalfa at top production for seven years and we're trying our system out on this field. After the second year it needs plenty of potash and phosphate."

No grain is sold off Conner Prairie, but some wheat is traded for oats and protein feed. Last year 335 acres of corn, 174 acres of oats, 100 acres of wheat, 250 acres of alfalfa, 30 acres of sweet sudan grass, and the grass off 250 acres of permanent pasture went into 1,000 hogs, 300 cattle, and 70,000 pounds of milk. Back on the land went approximately 1,800 tons of manure.

Manure is hauled daily and spread on the fields when the dairy herd is not on

pasture. That from the cattle barns is hauled out when it gets about a foot deep. Fields intended for corn are given the first call on the manure. What is left goes on the wheat as a top dressing.

Pastures are not grazed closely but are rotated. As much as possible of the first cutting alfalfa is ensiled and fed out during the summer as substitute for supplement. Last year 660 tons of grass silage was put up.

Corn is picked and cribbed and the stalks disced for winter cover. Because of the high price of straw for bedding, almost the only thing bought outside, some corn stalks are chopped and blown into the barns for bedding. Cobs are used extensively as bedding for hogs.

A "book" is kept on each field. A worker going into the field takes the field's "fever chart" with him and enters date, hour, time spent in the field and the nature of the operation. Crops coming off are weighed. Each field is charged for depreciation of machinery, labor, seed, fertilizer and management. Should a field fail to come up to expectations the cause can be determined more easily and sometimes rectified. This system of managing fields individually, Bubenzer believes, is partly responsible for the high efficiency on the farm. It also shows comparisons on the productivity of different soils and rotations and will eventually show an efficiency curve in the amount of fertilizer required. A comparison with Purdue standards of efficiency of the average American farm was recently made at Conner Prairie. The efficiency was rated high.

### Stock

Bubenzer is a horseman at heart, showing saddle horses for ten years, among them was the world champion five gaited horse, Jeb Stuart, in 1938. He tried to make the Percheron horses on Conner Prairie a profitable enterprise by using them as work horses but found that field work could be accomplished more economically with tractor power. Since specialization seemed to be the trend of agriculture it was felt that by concentrating on three live-stock departments Conner Prairie Farm could best utilize the land and buildings. After careful consideration Bubenzer decided to handle hogs, dairy cattle and beef cattle on this farm. He disposed of 60 purebred Percherons and went out of the blue ribbon business. A fine herd of purebred Scotch Shorthorns, one of the best in America, was sold to Purdue University. The breeding of Shropshire sheep and Berkshire hogs for show was discontinued. The hog program was entirely reorganized on a pork and seed stock basis. The horse barns were converted to dairy barns and a Holstein dairy herd purchased. The farm also feeds out 300 white face cattle per year to untilize the pasture land.

Each fall a western herd is topped for the best 300-400 steers which are brought in, fed on ensilage and hay through the winter, and put out on knee-high alfalfa in the spring. They are in excellent flesh when they are brought into the feeding barns in September to be finished, selling in December at about 950 pounds.

Silage is well thought of at Conner Prairie as a cattle feed. This year the the permanent silos were supplemented by a temporary experiment built of four-foot welded wire fence, 2" x 4" mesh, and sisal craft paper. The chute for emptying is made of 18 inch galvanized pipe. When half filled the silo began to lean dangerously and looked not unlike a rough imitation of the leaning tower of Pisa. The trouble, it was discovered, was due to the uneven settling caused by the extra weight on the side opposite the chute. Guy wires brough it back in line and something was learned about temporary silo construction.

Around central Indiana they say, "When anything new in farming comes along, Conner Prairie will try it." Conner Prairie does try out new ideas and passes the practical results along to its neighbors. A few years ago farmers became excited over a new meat hog developed at the University of Minnesota. Two types, known as Minnesota No. 1 and Minnesota No. 2 are being used in crosses with other breeds to produce a fast finishing, meat type hog for the modern market.

After extensive study Bubenzer became convinced that the


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future of pork production could be improved considerably by specialization; one type farmer specializing in seed stock with production records, the other raising pork for the market on a much more efficient basis.

This farm as a seed stock establishment has an ambitious program for improvement of market hogs in Indiana. The plan is to sell to the pork producer a group of good gilts out of high production tested sows of one breed, for example, purebred Hampshires, and also sell to him at the same time a boar of a different breed, such as a Minnesota No. 1. After using this boar for one or more litters, he will pick the best gilts out of this first cross and cross them with a boar of a third inbred, purebreed breed,, like a Minnesota No. 2. This will give the pork producer the Conner-Three-Way-Cross, a sow which will carry the blood of three production tested purebred lines and a hybrid vigor of 87%. To keep the same per cent of hybrid vigor as well as to guard the quality from disintegrating they recommend to continue in this rotation breeding program, using in the fourth cross a Hampshire boar, the fifth cross a Minisota No. 1 boar, the sixth cross a Minnesota No. 2 boar, etc.

Semi-solid buttermilk is the basic hog feed at Conner Prairie. The semi-solid is mixed one-to-eight and fed to sows, young pigs, seed stock and meat hogs alike in varying amounts; Jim Ogle, the swine herdsman, believes semi-solid keeps down worms and takes care of most of the ills that pester pigs. A 40 per cent supplement, mineral and shelled corn, is fed pigs from birth to six month of age. Pigs are weighed at birth, at weaning time, and periodically until they are sold. The production line includes sanitary farrowing houses and a series of permanently fenced one-acre plots on which the hogs are ranged at various stages of their growth. The plots are kept sanitary by discing and replanting. Eight weeks a year is the longest any plot is used for young pigs and these lots are rotated to allow for purification by sunlight.

At weaning time all pigs weighing less than twenty pounds are culled and sold as runts. The remaining pigs are classified as to type, weight, appearance and litter production. Those not meeting the specifications for seed stock are fed for the yards. From the choice animals the farm's herd is replenished and seed stock sold.

The dairy is entirely separated from the rest of the livestock by the river. It consists of approximately 100 head of Holstein cattle, 42 head of which are on milk. All cows are regularly D.H.I.A. tested. About 200 gallons of milk is sent to Indianapolis each day. The offspring will be used as replacement stock in the herd; bulls from high producing cows will be sold as seed stock and a limited number of heifers and good milk cows are sold.

Two men handle this dairy herd and each man gets a day and a half off each week. Until a time study was made of the dairy operation and new machinery and hand picked workers were introduced, two men worked seven days a week with 28 cows. Now Conner Prairie plans to increase the herd to 80 or 90 cows on milk, install more automatic machinery and add one more man.

A former horse barn near the dairy barn will be remodeled into a loafing barn. Forty-two cows will occupy the stanchions in the present barn; forty-two will occupy the loafing barn and altenate every other milking in the stanchions. A series of gates and passage ways will shuttle the two herds back and forth without confusion.

The small farmers around Conner Prairie say they like their big neighbor. New experiments in crops, management, and machinery are constantly going on at the big place and the practical results are available to all who ask. Farmers round about are watching the experiment in seven-year alfalfa, and are buying the new hogs to grade up their herds.

Several of the 4-H club steers of the county were the top animals from the annual shipment of feeder stock to the Farm, selected with the help of the Farm manager and the county agent. There is a constant cavalcade of visitors at the Farm; veterans vocational groups, extension state workers, soil men, stock breeders, and students from the state agricultural school.

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## FARMS AUTHORS

ALFRED S. CAMPBELL farmed in New Jersey for 18 years before he purchased his present 225 acre farm in Vermont. There, in the heart of the maple syrup country, Mr. Campbell spent last winter preparing for the bumper crop of maple syrup that we hope he harvested this spring. He has also been restoring the farm house on this new property, a house built 175 years ago and surrounded now by a cluster of barns. During the war he was a field director with the American Red Cross on the Original Guadalcanal assault. Now back on the farm he has a long list of plans, one of which is starting a herd of good dairy cows sometime this year. In his story "The Bill For Horace's Bull," page 32, he relates the familiar problems facing every owner of purebred heifers when the neibhbor owns a grade bull and poor fences.

DOROTHY L. PILLSBURY who wrote Desert Corn on page 38, is an historian on the Indians of the Southwest. She spends most of her time traveling through that country studying the Indians and their habits. A native of California, she moved to Arizona several years ago, where "I rooted in adobe soil," she says, "as naturally as a grain of Indian corn." She has her own adobe house near Santa Fe, which serves as her headquarters. In her own words, "It's a good life."

KARL MASLOWSKI returns to the pages of Farm Quarterly in this issue for his second appearance. Both times this Georgia born naturalist has brought birds with him. The first time it was Barn Owls. In this issue he gives both sides of the old argument on the character of that little loved farm bird, the crow, page 84. Mr. Maslowski spends the majority of his time in the fields and woods with his camera and notebook. His color movies of wild life have been shown in cities all over the country on his lecture tours.

EARL FRANKLIN KENNAMER is an Alabama born specialist who spent most of his earlier years on farms. "That farm experience," he says, "was acquired when a farmer sneered at the thought of chemical fertilizer." In this issue, page 40, Mr. Kennamer tells of Alabama experiments which prove that fertilizer will make even fish grow bigger and faster. He is now employed with the Alabama Extension Service where he keeps in close touch with farmers and the new practical developments in agriculture.

ROBERT R. JOHNSON, who wrote "White Corn," page 88, is not a newcomer to *Farm Quarterly's pages*. He will be remembered for his contribution to the Autumn 1947 issue in which he wrote on Brome Grass.

DR. FRANK P. TODD author of "Fistulas Are Dynamite," page 58, graduated from the College of Veterinary Medicine, Ohio State University. His specialty is large animals and he admits that horses are his favorites for he comes from a long line of horse fanciers. He is custodian of an excellent army remount stallion and by employing artificial insemination is using this stallion to build stamina and fine riding quality in horses throughout southern Ohio. Incidentally, Dr. Todd is the man performing the gory operations in the pictures that accompany his article, proving that the author is close to his subject.

ROBERT ZINN is the product of a general livestock farm in Hancock County, Illinois. After he graduated from high school he worked on his father's farm for three years before he decided to bolster his practical knowledge of livestock with some book learning on the subject. He entered the College of Agriculture, University of Illinois and graduated in 1939. Zinn returned to the school room for seven years of teaching vocational agriculture. In 1945 he joined Allied Mills as swine specialist. From this varied background he drew his material for the article, "The Points Of A Hog," page 34.

LLOYD D. MILLER fed Missouri mules to pay his way through college. He was no newcomer at feeding livestock for he spent his first 21 years on his father's livestock farm in northwest Missouri. He covered the farm scene in the midwest


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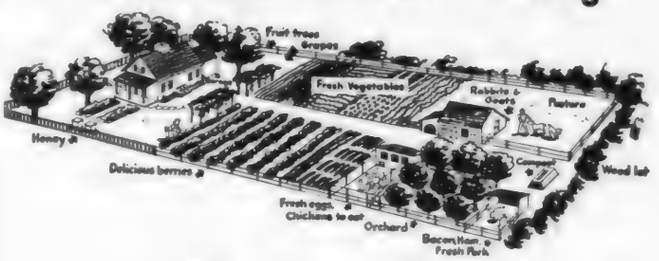


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If you, too, would like to know how to do "WONDERS with a Little Land"—if you'd like to make the very most of the garden, farm or country home you now have—or hope to have some day—just send me the coupon below. You'll receive your copy of The "Have-More" Plan by return mail. If you aren't more than pleased, return it, owe me nothing and we'll still be friends. *Yours for "a little land—a lot of living." Ed. Robinson,* Box 3104, Noroton, Conn.

**SEND NO MONEY**
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**Ed Robinson, Box 3104, Noroton, Conn.**

Dear Ed:

Please send me a copy of your "Have-More" Plan postpaid. If I decide to keep it, I'll send you one dollar plus the ten cents it has cost you for postage, packing, and handling. If it doesn't suit me I'll send it back, owe you nothing, and we'll still be friends.

Your name.....

Address.....

City..... State.....

(Of course, if you'd prefer to send one dollar now, that would be fine—save me a lot of record keeping and save YOU the ten cents shipping charge. I'll give you DOUBLE your money back if you return the Plan for any reason in 10 days. That's how sure I am you'll like it.)

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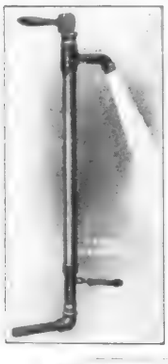

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WILMINGTON 99, DELAWARE


for several daily newspapers until the second World War, which was responsible for a round trip to the southwest Pacific, expenses paid. He is now an official of the American Aberdeen Angus Association. His contribution to this issue, "The Polled Blacks," page 54, is a well balanced picture of the place occupied by this breed on American farms. James Quisenberry of Winchester, Kentucky, gave Miller his method of making money on his Angus cattle which came home from the 1947 International in Chicago with a string of ribbons.

Each issue of *FARM QUARTERLY* includes a discussion of some single group which has preserved their own special culture and farm methods. Past issues covered:

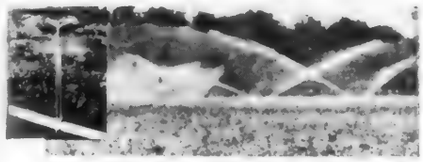
| | |
|---|---|
| The Tennessee Mountain Farmer | Spring, 1946 |
| The Amish | Summer, 1946 |
| The Yankee Farmer | Autumn, 1946 |
| The Finns | Winter, 1946 |
| The Utah Farmer | Autumn, 1947 |
| The Alaska Farmer | Winter, 1947 |

During autumn of 1947, the editors were discussing which group would most interest readers of *FARM QUARTERLY* this spring. Since newspapers were full of the Marshall Plan and the political unrest in France, it was natural that talk got around to the French farmer. How does he live; what are his crops; how were his harvests? We would make no attempt to answer major questions about French agriculture, or French economics, but we could tell honestly and completely the story on one French farmer. Since Ralph J. McGinnis, editor of *FARM QUARTERLY*, spoke French he got the assignment and flew over a few days later. Mac stayed with M. Chaussy Raymond, the French farmer in whose home he was billeted in World War I. During his stay with M. Raymond, Mac helped him sow his winter wheat.

"The French Earth," page 14, won't tell you "the future of French economics," nor "how forty million Frenchmen live." We don't know enough to answer that one. But it does give the facts about two French farmers, M. Raymond and his neighbor, M. John Huguet.

On his way back to America, Mac stopped off at Paris "to see an old friend," so he said. On an evening in early November he sauntered into the Place d'Etoile and ran into one of those little riots you've read about in the newspapers. A DeGaullist was speaking and the Communists came in to break it up. The gendarmes smashed cameras of news photographers first then rounded up the reporters and carted them off. Having dutifully taken care of their censorship chores, the cops then broke up the riot; only three people were killed. If you have to live in Europe these days, a farm is the best place to live. Mac left Paris after two days: "No food, no light, no heat," he said.


**Water more acres for less cost!**



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An installation of Skinner Sprinklers makes you independent of weather conditions—you make your own rain and give your crops a shower whenever they need it.

There is a Skinner Sprinkler for every watering purpose. Our catalog will be mailed you without obligation. Write us for it today.

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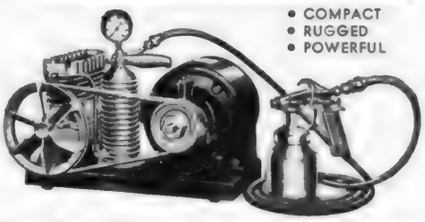

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This *4 cylinder compressor* has drop forged crankshaft, stainless steel, heat treated valves; bronze bearings and positive forced feed lubrication. Maximum pressure 50-60 lbs., free from pulsation. Standard equipment includes the compressor mounted on steel base with carrying handle, belt, compressor pulley, air chamber, air gauge, 15-ft. hose, spray gun; ½ or ⅔ h.p. motor or gas engine. Immediate delivery. If your dealer does not sell Pressure Queen write direct

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with MULKEY'S NEW IMPROVED* All-Steel PORTABLE* BALANCED ELEVATOR for
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24 ft. Long
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A'so Available: 16' Elevator (Same design)

* One man can handle and operate.
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## THE FARM'S PICTURES

**Cover by: Brooking Tatum-*Shostal***

All photographs appearing in this issue were taken by Joe Munroe, our staff photographer, with the exception of those listed below:

5—Winston Pote-*Shostal*. 14 through 25—R. J. McGinnis. 28—J. C. Allen & Son; USDA—Cartographic Division. 29—National Soybean Processors Assn.—University of Illinois. 34—Cy LaTour. 35—J. C. Allen & Son; R. J. McGinnis. 36—W. R. Wilson; J. W. McManigal. 37—R. J. McGinnis. 38—Jack Breed—*FPG*. 39—New Mexico State Tourist Bureau. 41—Rex Gary Schmidt. 42-43—F. Knoop. 45—SCS—Jenkins. 46-48—R. J. McGinnis. 50—Conner Prairie Farms. 54—Lloyd D. Miller. 56—American Aberdeen-Angus Association. 57—Guy E. Smith; J. C. Allen & Son. 58-59—F. Knoop. 61—Division of Plant Nutrition—University of California; Deere & Co. 62—Munroe-Hoffer. 63-64—Deere & Co. 65—Oliver Corporation; Allis Chalmers Mfg. Company; Harry Ferguson, Inc; Minneapolis-Moline. 66—E. Wilkinson. 69—F. Knoop. 70—Joe Clark. 72-73—F. Knoop. 74—Roy Pinney. 75—F. Knoop. 77—Strohmeyer & Carpenter. 78—A. B. Morse Company. 79—Wendover Neefus, Jr.—University of New Hampshire. 80—Nola Wibel; Bureau of Plant Industry, Soils, & Agricultural Engineering—USDA. 81—Nola Wibel. 82—USDA—Killian; New Jersey Experiment Station. 83—Bell Aircraft. 84—George A. Smith. 86—Allan D. Cruickshank. 89—J. C. Allen & Son. 90—Standard Oil Company-Vachon. 91—Paul Hadley. 99—U. S. Fish & Wildlife Service. 111—Carl Mansfield. 112—Fred Knoop. 124—R. J. McGinnis. 126 through 128—R. J. McGinnis.


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For row crop cultivation the TILLIVATOR is in a class by itself. Any combination of row widths can be cultivated accurately, destroying weeds in one operation. TILLIVATOR is easy to handle . . . adjustable to row spacings and row widths. Write for complete information showing the TILLIVATOR in full color.

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The only tiller with: Full horsepower motor — 9 h. p. model B; 7 h. p. model C... Standard two speeds forward and reverse . . . Positive action multiple disc clutch . . . Full sized 9/16" electric alloy steel tines . . . Center shoe and share assembly cuts out middle and tills entire area.

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**20% GREATER DIGESTIBILITY OF GRAIN PROTEINS WHEN BLUE RIBBON CONDENSED BUTTERMILK IS USED**

Tests made at a leading midwestern agricultural school prove that when buttermilk is added to the diet of hogs and poultry, digestibility of grain proteins is increased by 20% or more.

- Plain Condensed Buttermilk
- Fortified Pig Buttermilk, with Vitamins D and G
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- Fortified Breeder's Buttermilk "E" with Vitamins D, G and E

Plants throughout the Central West States

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## *Grand Champion - - and Sire of Champions!*

True Type, Record 538759. Grand Champion at the 1947 Ohio State Fair; first prize mature boar at the 1947 Indiana State Fair, and sire of Reserve Junior Champion Boar.

**All rations include SACCO V-19 MINERAL**

Circle Oak's Farm at London, Ohio, is famous for the quality of its swine herd. Owners A. W. and C. E. Jordan say: "Good blood lines — sanitation — and proper feeding result in a productive herd. We use Sacco V-19 Mineral because it's a complete, balanced mixture of highest quality." 24,000 units of Vitamin D added to every pound. Try Sacco V-19 — feed it to all your farm animals. See your Sacco dealer, or write us.

**THE SMITH AGRICULTURAL CHEMICAL CO.**
Plants at Columbus, Ohio, Indianapolis, Ind., Saginaw, Mich., Holland, Mich., Carey, Ohio.

SACCO V-19 MINERAL FEED

**The SILVER KING TRACTOR**

## *For Better Service, Longer*

From planting to harvesting and the tough jobs in between, the flexibility and power of the all-purpose Silver King makes farming faster and easier. Smoother operation provided by automotive type steering, handy controls, and full energized brakes means increased productivity — better living — more leisure. Precision-built, the Silver King is designed to give years of dependable, trouble-free service at low cost for any farm tractor job.

*Fingertip Steering • Safety Brakes • 3 and 4-Wheel Models • Lower Fuel Consumption • Side and Rear Power Takeoff • "Multi-Range" Governor, Speeds Up to 20 M.P.H. • Ample Power . . . in the Field, on the Highway*

THE FATE-ROOT-HEATH COMPANY • Dept. C-2 • PLYMOUTH, OHIO


## THE ROTARY TILLER

(Continued from page 72)

easy to germinate and grow. The important part about finely tilled soil is that it holds more moisture because more surface area is provided on which the water can form a surface film. The well-mixed mulch of organic matter in the soil gives the effect of "hair in plaster" to hold the soil in place and resist erosion.

Like every other new tool the rotary tiller has had its critics. Some say it costs too much; that it won't work in high weeds; that it doesn't run fast enough. George Lewis, a commercial farming contractor, of Newtown, Ohio, has owned two Rotary Tillers. The first one he sold because he didn't learn how to use it properly. His second one, which he bought two years ago, he considers one of his most valuable pieces of equipment in handling 3,000 acres of southern Ohio land.

Lewis has worked out his own high-speed method of using his six-foot Seaman

LEWIS' KILLIFER disc is used ahead of the Rotary Tiller on heavily weeded ground.

Tiller in combination with his other tools. One particularly efficient combination for some of the hard and heavily weeded soil in which Lewis has to operate is with a double Killifer disc. He pulls this series of heavy 26-inch discs with a Caterpillar tractor at 5¼ miles an hour. The Tiller follows the same day, a week later, or a month later and puts the soil in shape for seeding. Lewis says, "I have to get speed in all my operations or I'll never get done. I've found on disced ground I can run my Rotary Tiller up to five miles an hour and get the same results as in using it at one or two miles an hour on a single pass at the field. What's more, my gas consumption on the Tiller engine is about 1½ to 2 gallons an hour as against 5 to 6 gallons on the single pass method."

Waving his hand across a clean field Lewis continued, "The weeds get mighty discouraged after I've farmed a field a couple of years with the Tiller. If the ground is given proper fertilizer I've found that the crop yields will increase too. I think this is due to the better moisture holding power of this type of soil preparation. I've found that two men can get 35 acres ready for planting in a 12-hour spring day when the soil is in good shape. One man handles the 'cat' and the disc, the other runs the Tiller."

## LETTERS —(Continued from page 12)

### RADIO-ACTIVE FERTILIZER

Sir:

At the end of my letter about radioactive fertilizer which was printed in the winter issue, I found a footnote about which I had no prior knowledge. Although I do not have the slightest intention to use your publication for polemics, I feel it is my duty to clear up any wrong impressions which may have been left with your readers.

The only conclusions which can be accepted or refuted in science, must be based on results obtained by scientific experiments and research.

Experimental research on the use of radioactive material in agriculture was initiated around the turn of this century. The experiments were conducted by highest university authorities, agricultural stations, agricultural experts, large private agricultural enterprises, etc.

There exists a voluminous scientific literature representing hundreds of scientific reports written and printed in scientific publications throughout the entire world. Some of this literature are included in the minutes of National Academies of Science in various European countries.

I refer anybody who is interested in becoming acquainted with this question to the bibliography contained in the book "Biology of Radium and Uranium" by Julius Stoklasa and Josef Penkava, published by Paul Parey—Berlin, where the reader will find a number of very prominent names of men of science. Since the publication of this book, many other articles have been written and published in Europe. One of the last ones, and by no means the least, is the symposium written under the signature of Drobkow in SCIENCE AND LIFE, No. 3, March 1947, published by the Academy of Science of the U.S.S.R. This particular article not only cites field experiments, but basic laboratory research, confirming the statements contained in my letter.

We intend to manufacture a radio-active stimulant that can be spread directly on the soil or added to any commercial fertilizer. This material, known as *Alphatron,* is composed of minute quantities of mostly alpha emitting natural radio-active elements, diluted in a neutral carrier.

Alphatron, when ready, will be distributed free to State Agricultural Stations, Universities and similar institutions that request it for experimental purposes.

We are now in the process of preparing a detailed report on basic principles and experiments conducted by us and independent investigators which will answer the questions and dissipate a great many of the doubts and uncertitudes which have been expressed in connection with this subject of vital social and economic interest.

Boris Pregel, President
CANADIAN RADIUM & URANIUM CORPORATION
630 Fifth Avenue, New York 20, N. Y.

The article mentioned by Mr. Pregel "Influence of Radioactive Elements Upon Lives of Plants" by A. A. Drobkow, which appeared in Science and Life, No. 3, March 1947, published by the Academy of Science of U.S.S.R., appears to be in accord with statements made by Mr. Pregel in his letter in Farm Quarterly, Winter issue. U.S.A. government scientists at Belstville and Oak Ridge, however, were not in full agreement but have since changed their minds.

The Russian article states:

1. A certain amount of radioactivity is necessary for the normal development and growth of the plants.
2. There is a certain range in the quantities of radioactive substances necessary for beneficial development. Too large a quantity is detrimental to the plant; too small a quantity is without important effect.
3. The comparative experiments were made in distilled water or in sterile sand in which the same amount of nutritive solution and the same amount of micro-elements were introduced. The only difference in the experiments presumably was the difference in the amount of radioactivity introduced. The photographs of the experiments shows clearly the differences in growth, so that these differences could only be ascribed to the influence of radioactivity.
4. The radioactivity of the plants grown in radioactivated media, whether it be sand, water or soil, was measured. Different plants absorbed different quantities, but the radioactive elements absorbed by the plants were infinitesimal. The use of these plants for food or fodder is harmless, it stated, because even if accumulated for a long period of time, it will still be under the accepted tolerance figures.

Question: Is radioactivity necessary to plant life, and can it be introduced commercially so as to increase plant production enormously with the resultant food having no harmful ingredients? Mr. Pregel, a man who has devoted his life to the distribution of radium and uranium believes the answer is "Yes."—Ed.

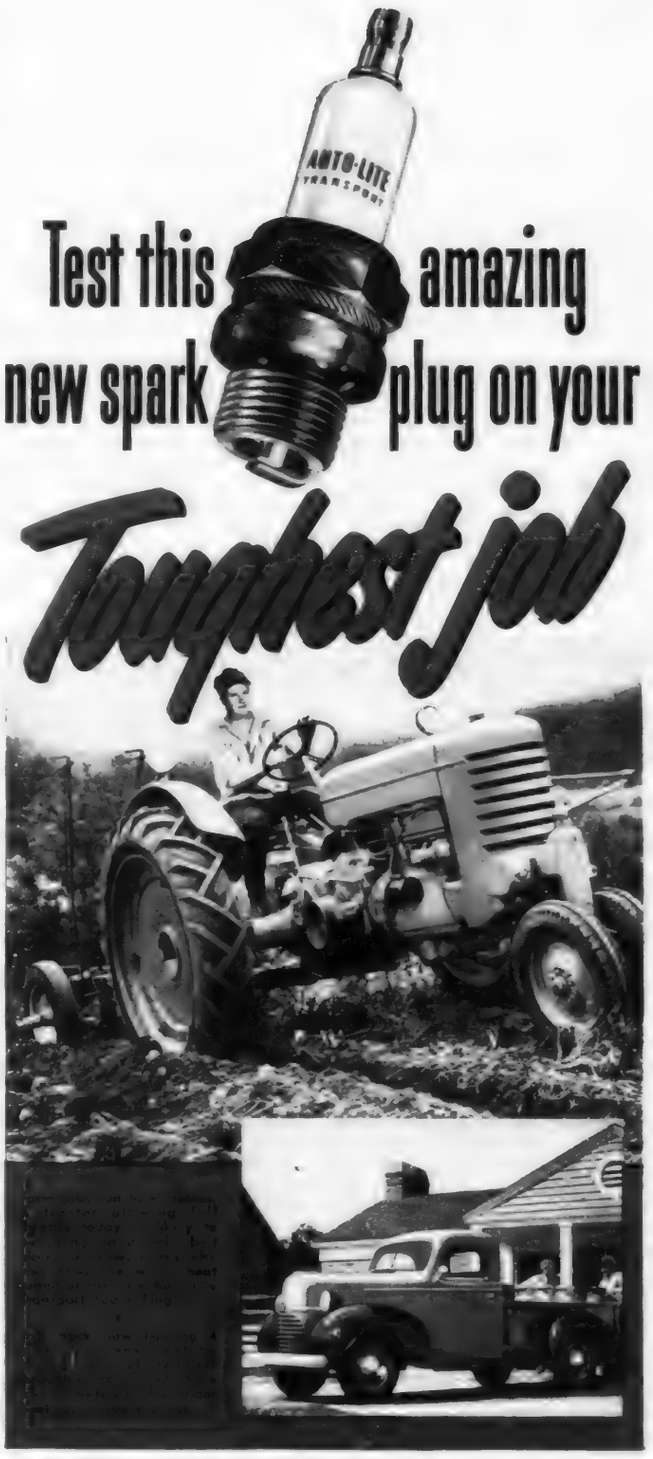
### MAJOR'S AIDE

Sir:

I was having a terrific problem at college to solve a project. I am a Zoology Major. Strange as it may seem, I merely took your magazine to the campus, read a few passages, received a wonderful grade, and was highly complimented, mind you, by my professor for commendable "research." I told him my source of information and we used the magazine thereafter. I thought this hint might be useful to you, to know that as a science major I find it very helpful.

Miss Mariea L. Vaughn
Ojai, California

(Continued on page 144)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AUTO-LITE SPARK PLUGS

# HARD WORK becomes EASY WORK

Ford TRACTOR

## That is why the Ford Tractor helps you get more done

As every farmer knows, discing can be mighty hard work. But with the Ford Tractor and a Dearborn Disc Harrow, discing becomes an easier job. What's more, you can finish ground faster and with better all-around results. Let's see why this is so—

Dearborn Disc Harrows are controlled by the exclusive built-in Ford Hydraulic system through the touch control lever. This lever does the hard work for you and saves plenty of time in the bargain. With it you raise or lower the Dearborn Lift Type Discs. Or, with the Dearborn Pull Type Discs, you use it to angle and straighten the disc gangs. You don't have to strain or tug, or pull on long levers, or manipulate trip ropes or other devices.

Thus, no matter which type of Dearborn disc you use, there are no ridges or mounds of dirt left at the end of the field. You can cross grassed waterways without damage. You're never in "trouble" when you suddenly come into wet spots in the field. And because you relieve the load from the tractor when turning, you cut down on fuel consumption and costs.

Ask your nearby Ford Tractor dealer to demonstrate a Dearborn Disc Harrow right on your farm. See for yourself how much easier, faster and better you can get your discing done. Put the Ford Tractor through its paces, too. Find out what it can do for you.

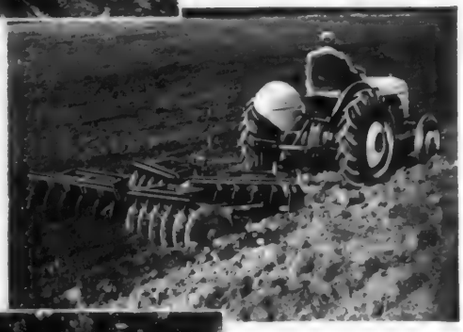
DEARBORN MOTORS CORPORATION • DETROIT 3, MICHIGAN

Dearborn FARM EQUIPMENT

*The only time that Counts is Working Time*

### CHOOSE THE DEARBORN DISC THAT FITS YOUR NEEDS

At left—This Dearborn Lift Type Single Disc is raised to transport position . . . or lowered to working position . . . with Ford Hydraulic Touch Control.



With both model Dearborn Tandem Discs, right and below, you set the working angle of the disc gangs . . . or straighten them . . . with Ford Hydraulic Touch Control.

There is a Dearborn Disc Harrow to fit your farm. Whatever type you choose will be well designed and strongly built and it will do more discing faster, easier, better.

# Only the Ford Tractor Gives You THESE 3 BIG ADVANTAGES

## WITH FORD HYDRAULIC TOUCH CONTROL

● The illustrations at the right demonstrate how the built-in Ford Hydraulic system, with Hydraulic Touch Control, works in plowing. Here are the three big advantages:

1. ***Lifts and Lowers at a Touch.*** You lift or lower a Dearborn Plow, or any other Dearborn Lift Type Implement, by merely touching the hydraulic control lever. No straining or tugging.

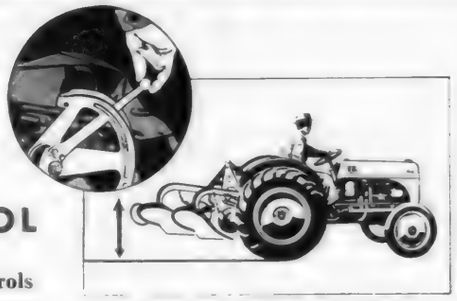
2. ***Automatic Draft Control.*** Under uniform soil conditions, the selected working depth will be maintained *automatically*, even in fields with an irregular surface.

3. ***Automatic Depth Control.*** Under reasonably smooth surface and practically all soil conditions, just set the controls once and uniform working depth is constantly and *automatically* maintained.

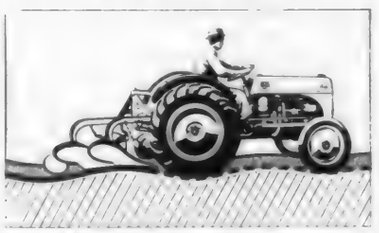
* * *

The Ford Tractor has many other advantages. For example, when you need extra weight for traction, you get it...*automatically*, through the Ford Hydraulic system and 3-point linkage. That's why there's no need for unnecessary "dead" weight in the Ford Tractor. In this one tractor you have a "heavy" tractor for hard jobs and a "light" tractor for easy jobs. No wonder it's such an economical tractor to operate. No wonder it works so many more hours for its owners.

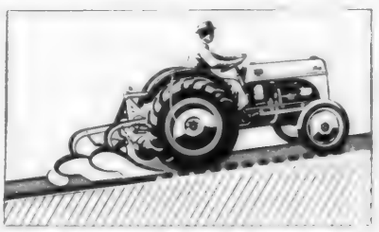
*See Your Dealer.* Your nearby Ford Tractor dealer is headquarters for Ford Tractors, Dearborn Farm Equipment, genuine Ford Tractor parts and for implement and tractor service second to none. Stop in at his place of business the next time you are in town.



1. LIFTS AND LOWERS AT A TOUCH



2. AUTOMATIC DRAFT CONTROL



3. AUTOMATIC DEPTH CONTROL

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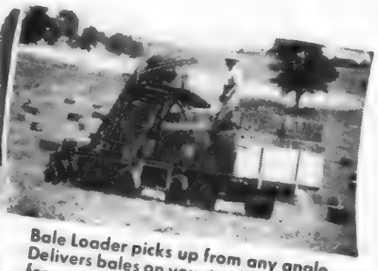
*Ford Farming* MEANS LESS WORK... MORE INCOME PER ACRE

# Real Engineering PAYS OFF WHEN FARMING IS TOUGHEST...

THAT'S why New Holland's simple design and down-to-earth engineering stand out. New Holland farm machinery is built to stand up and deliver in the rough spots. Like the Baler that saves you time and trouble right in your busiest season... makes your farming easier and more profitable. And there's a New Holland time and labor saver for every season. Let us help you plan now for a full year of mechanized farming. Write Dept. DD-4 today for free descriptive literature.

The New Holland Model 76 Hay Baler bales and ties automatically up to ten tons of hay an hour. Only one man, to drive tractor, is needed.



Bale Loader picks up from any angle. Delivers bales on your truck or wagon for easy stacking.

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NEW HOLLAND MACHINE [illegible] PENNSYLVANIA, U. S. A.


## GIVE IT AIR

*(Continued from page 65)*

This year a new problem developed. The sweet clover weevil attacked the new sweet clover seedings. Condor was going to have his sweet clover, weevil or no weevil. Unable to get information on how to irradicate the pest, he took the bull by the horns, bought some 5% DDT powder, hired an airplane, and dusted about 400 acres. This treatment cost around $3.00 per acre but saved a crop which Conder feels is worth $40.00 per acre when corn is $2.00 per bushel.

### Mechanical Destruction of Compactions

There are those who believe that machinery can do a good job of admitting air and moisture to the subsoil. They say that only with machinery designed for the job can the hardpan or plowsole be effectively broken up in clay soils, or soils that run to clay, or in special cases, such as compacted soils in irrigation ditches where machinery has worked over wet earth. The deep-rooted legumes may work fine on some farms, they say, but not all farms will grow sweet clover or alfalfa, and anyway they work slowly, and if they are properly distributed in the rotation the soil becomes compacted during the two or three years interim. However, no machinery can introduce organic matter into the subsoil as the legumes do, the trump card of the farmers who place machinery in second place as a soil aerator.

Machinery does a quicker job, and it can be repeated as often as necessary. Machinery, however, should be regarded as adjunct to tap-rooted legumes. Machinery can not supply humus. In addition to opening up the subsoil to moisture and air, and breaking up the hardpan, machinery is an effective way to combat surface erosion. The heavy, deep-running chisels and subsoilers leave a porous, slot-like furrow which readily admits a large amount of surface water and carries it to a sufficient depth to store it for dry periods.

One of the best-known tools designed for breaking up the plowsole is the Oliver TNT plow. This is an ordinary moldboard plow to which is added a second unit which can be set down to four inches below the pan of the usual plow bottom. The lower base is offset four inches from the upper base to reduce the draft required to pull the plow. The bottom of the furrow, which is left hard and smooth by the conventional moldboard plow, is broken up and permits the free entry of plant roots, air, and moisture. The TNT plow overcomes the objection of deep plowing, which turns the subsoil to the top of the ground, but at the same time effectively breaks up the plowpan. Hardpan which is more than four inches below the plowsole is, of course, not affected. By setting the lower bases at different levels, effective sub-surface catch basins are formed to hold ground water on slopes.

"Mary Had a Little Lamb"

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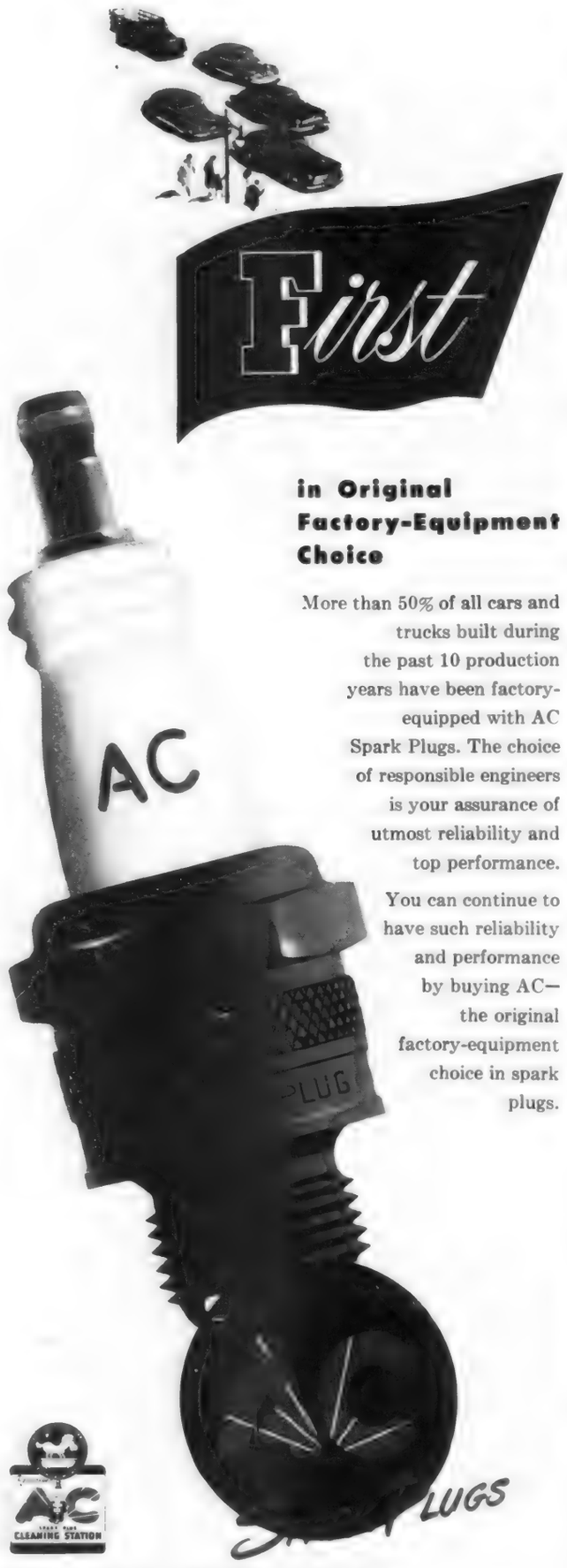


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### The Hardpanbreaker

Other implements on the market, such as the John Deere—Killefer chisels and panbreakers, go deeper than the TNT plow—deep enough to break up hardpan to 48 inches, a depth which would seem to be adequate for moisture storage and for the bulk of the root systems of most plants. The Allis-Chalmers chisel subsoiler penetrates to 16 inches and the Minneapolis-Moline Uni-subsoiler to 18 inches. Both are popular in the West where moisture conservation is an important factor. Minneapolis-Moline makes subsoiler attachments for its effective Uni Tiller. Harry Ferguson, Inc., makes the Towner subsoiler and plow sole tiller. Roots which penetrate deeper than chisels and panbreakers work are mostly in search of moisture. A few minerals are perhaps available below this depth, but the feeder roots near the surface of the topsoil do most of the feeding for the plant. Oat roots will extend downward 16 inches in the first 45 days, 27 in 60 days, and may finally reach 40 to 52 inches. Corn roots grow downward 5 to 6 feet, sugar beets 3½ to 6 feet, barley 4½ to 6½ feet, rye 3½ to 5½ feet, and sorghum 3½ to 6 feet. Alfalfa roots will go down to 12 feet in two years.

Any implement which makes it easier for plant roots to grow downward as they seem to want to grow, helps in establishing healthy, vigorous plants. The so-called chisel and panbreaker plows do this and at the same time provide an entry for moisture and air.

Deep tillage often is called "subsoiling," "panbreaking," or "chiseling"; it should not be confused with deep plowing.

Subsoiling or panbreaking is deep breakage from 18 to 36 inches and as deep as 48 inches in extreme cases. Chiseling is a shallower operation which destroys subsoil formations from 10 to 15 inches deep. Both operations leave the sterile subsoil below the surface where it cannot interfere with rapid seed germination. The field looks much the same as a field ordinarily tilled except for the narrow, slot-like furrows in the ground.

Proper use of the panbreaker or chisel is important. The heavy point is set at an angle and is regulated to work just below the subsoil layer so that the layer will be lifted and broken as the implement is pulled forward. In this way, the layer is more thoroughly destroyed: it shatters farther to either side and less power is required. The pick-and-shovel investigation will reveal the proper depth at which the implement should be set to work.

The furrows should be close enough together so that the subsoil formations in between are completely broken. Generally, they will break to each side a distance equal to the depth of work, which means that panbreaker furrows should be approximately three or four feet apart and chisel cultivator standards 12, 15, or 20 inches apart.

Deep tillage is usually done in the fall, at the driest season of the year. This is the ideal time because the subsoil is hard and brittle—it heaves and shatters easily and breakage is more thorough . . . the work can be done more leisurely . . . the soil remains open throughout the winter to receive snows and rains . . . subsoil clods are broken down and mellowed by the weather . . . the surface and stuble are left in excellent condition to resist wind erosion . . . and soil drainage is improved to permit earlier tillage and seeding in the spring.

The use of a subsoil plow need not disturb, to any great extent, the crop residue of stubble, or the cover crop, with which all good farmers like to cover their fields during the winter. There is comparatively little displacement of the topsoil and nothing is turned under. After the rainy season the fields are disked to close up the gashes and conserve moisture.

Right here is should be said that deep tillage is not a cure-all for every farm ailment, nor is it always economical or practical. Subsoil tillage has been a highly controversial subject among both farmers and agronomists. In loose soils of good depth its use is a needless expense. It must be mixed with common sense. The J. I. Case Company, which made a survey of experiments in fourteen states, discontinued the manufacture of deep tillage tools. As reported, the disadvantages (chief of which was the expense) outweighed the advantages.

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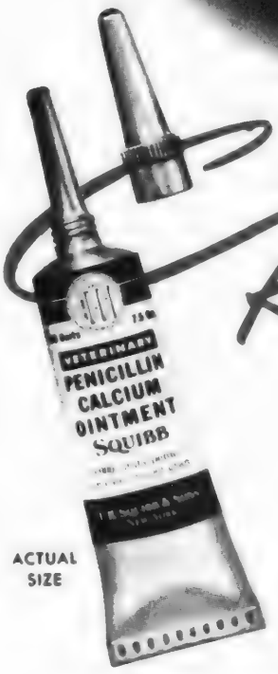


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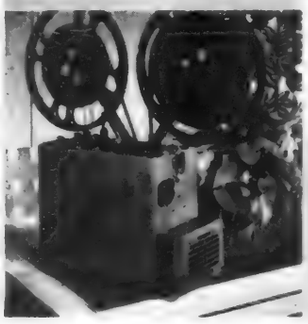

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Experiment stations reported to Case that subsoil tillage gave best results in tree planting, in the irrigated and compacted soils of the far West, and in some instances on very compacted soils of the Midwest and South. The high cost was a common factor. It is one method of utilizing all the available resources of the soil, thereby assisting nature to increase crop yields in certain types of soils. It makes it easy for the roots of subsoil busters as sweet clover and alfalfa.

The panbreaker or chisel cultivator, if used properly and at the driest season of the year, will break the soil below the surface so thoroughly that rainfall is completely absorbed by the soil column. A cloudburst of considerable severity has been stored in this way without terraces and with no erosion damage. It is a rare occurence when a properly subsoiled field will not absorb all the rain.

Deep tillage should be done along the contour of the slopes. This direction is of paramount importance. Operations directed up and down the slope provide natural channels to speed run-off water downhill with its load of soil. Panbreaker or chisel cultivator furrows along the contour, on the contrary, provide a series of obstacles to the flow of water and innumerable pockets, depressions, or furrows in which the water is held until it can enter the soil. Deep tillage, in conjunction with terracing, provides the acme of moisture conservation.

Various deep tillage tools are in use all over the country. From those who are afflicted with highly compacted clay soils comes the most enthusiastic reports of what subsoil tillage has done for them T. H. Collier, Rockford, Washington, says: "I have been using a chisel cultivator for about three years. I first chiseled 80 acres summer-fallow in a field with a clay subsoil. The following year I harvested the largest crop of wheat ever cut on that field—at least 10 bushels per acre increase. The past two years I have used the chisel on wheat stubble, increasing my yield, and have reduced the soil wash or erosion at least 50%. In my opinion, deep tillage will prove of great value to all of the rolling wheatland in this territory, just as it has for me. I find that by working around the fields the moisture goes into the ground and does not run off."

While farmers and soil scientists have a great deal to learn about soil aeration and its various effects on plants, they do know that the basic facts all point to the advisability of getting air to both the roots of plants and the soil organisms which are so beneficial to growth. Which is used, a tool made in a factory or a plant furnished by nature, matters little so long as air and moisture in some way is boosted along its way to deeper parts of the soil. Crops are almost universally helped. You can't stretch an acre—it's still 43,560 square feet, but you can make it deeper.

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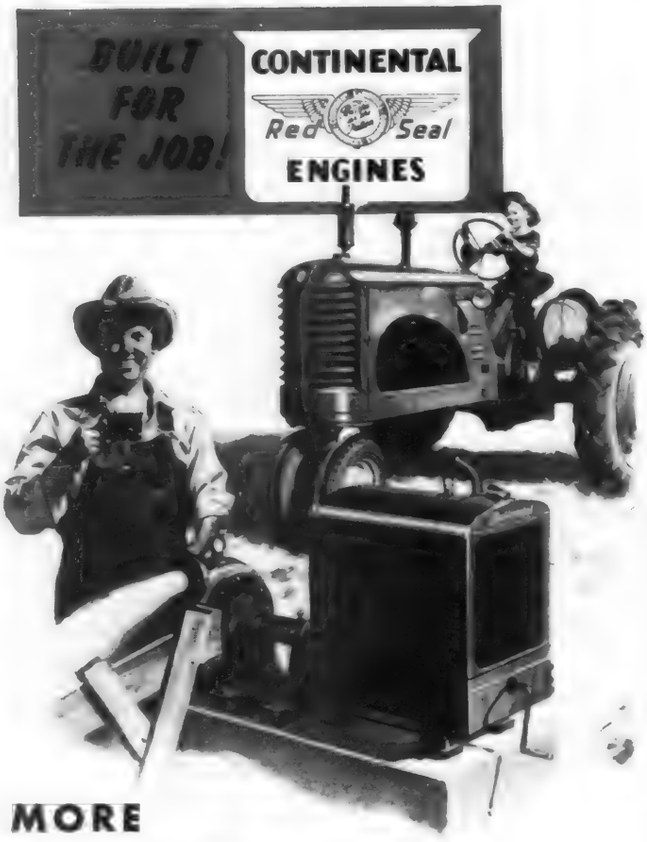


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## THE FRENCH EARTH

(Continued from page 25)

"When I grow up I'm going to America and marry a cowboy." A few American soldiers had passed through Chateau Landon, generous boys, big and strapping, with plenty of cigarettes and candy. Chaussy himself had a military jacket which an American soldier had thrown to him from a passing truck. It has a fur collar and is lined with soft wool. It is worn only on special occasions.

There is little frivolity in the life of Raymond's family. Once a week the little movie theatre in Chateau Landon shows a picture. The sound occasionally synchronizes with the picture, and it alternately blares and fades to a whisper. It costs francs and Chaussy and his family rarely attend. They attend the village church and on religious holidays they shake the moth balls out of their dress-up clothes and have a vacation.

There is little recreation for the young people: an occasional dance is held in the village and once or twice a year traveling carnivals set up in the market square with a merry-go-round, a fortune teller and jugglers.

Occasionally, when there is a surplus of vegetables from the garden, or an extra hen or rabbit, Madam Raymond will share a stand at the market in Chateau Landon. This is as much a social venture as one for profit, for the neighbors generally have the same surpluses at the same time. This results in a robust competition for the few customers in Chateau Landon who do not have a garden or a hen yard of their own. If Madam Raymond is able to buy salt and matches for the week and perhaps add a sou or two to the family savings she is pleased, but she enjoys just as much the bargaining that accompanies every sale. It is quite agreeable to her to spend the better part of an hour defending the virtues of an ancient stewing hen against the slanderous attacks of a prospective customer. The customer would rather buy it for less than is asked for it, than to receive it as an outright gift without the bargaining.

Chaussy likes to talk politics, but in recent years the subject has gotten beyond him. "In Paris they talk, talk, talk; here on our farms we work, work, work," he says. One change after another in the government, always going from bad to worse, the franc going down, the things he buys going up. He has given up in despair. Whom should he believe? He is inclined to favor DeGaulle because he believes him to be a French patriot. He believes with his entire soul that the only way to get anything is to work for it.

He and his family have had plenty to eat. His grandchildren are probably healthier than he was at their age. For his relatives in Paris, milk is strictly rationed, first call going to children up to four years of age. When there is any left, it goes to the next younger children. There has not been enough milk for all needs in France since 1939.

Chaussy's parents sold almost everything they raised, living on what was left, a mere subsistence. Now, since he has lost faith in the currency, he is more generous with his family. The children have milk, his daughter makes butter and cheese, there are plenty of chickens in the barnyard, and he holds back enough wheat to assure himself plenty of good bread.

In America the diet is built around meat; in France around bread. A Frenchman can endure a great deal if he has plenty of good bread; tamper with its quantity or quality and there's a revolution in the making. They say the French Revolution was touched off by the court's reply to the cries of the people for bread, "Let them eat cake." A Frenchman doesn't want cake; he prefers bread. And well he might, for in the whole world there is no food more tasty or nourishing than French bread at its best.

### Thrift, French Style

How can a family of seven live on sixty acres? To understand how this can be done with a measure of comfort and security one must understand the amazing thrift and ingenuity of the French farmer. When the wheat is harvested Madam Raymond,

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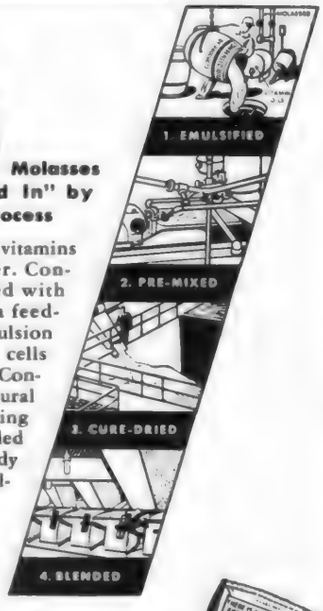


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her daughter and the three children follow the reaper, gleaning every head of wheat. Every gnarled apple beneath the trees against the courtyard wall is saved; when a fowl is killed, not even the feathers are wasted. Chaussy has a "good" suit of clothes. He got it from his father, who in turn, got it from his father. It is green with age, in the style of the late 1880's, but it is "as good as new" because there isn't a patch on it. Food and clothing, by American standards, are minor items of spending. The peasant's economy has always been simple: spend less than he makes. He figures by that reckoning he can't fail to save money.

It is difficult for an American to understand the personality of a French peasant farmer. The Frenchman works on his farm to make a living, as a way of life; the American farmer works to make enough to retire.

RACKS like these are taken to the fields and the hay is piled on them for drying.

Peasant thrift is sometimes cut very thin. Raymond tells of a friend who had an extra pasture which he advertised: "For rent, two hectares of pasture. For bob-tailed horses, 100 francs per week; for long-tailed horses, 119 francs per week." He did not need to explain to his neighbors that a bob-tailed horse would spend a part of his time brushing flies away with his head, would eat less.

In pre-war times Raymond could always count on getting help for the few days during the harvest season when he used an extra man. There are no idle men in the villages now, and he must stretch his working day to get in his crops. On the larger farms, regularly employing extra help, the labor situation is critical. Many young men died in German prison camps; many of the younger men who own no land followed high wages into the factory towns. The situation has grown worse since most of the German prisoners were returned; they were a real help during the two years since the fall of Germany. That is why the French are asking for tractors and other labor saving machinery and

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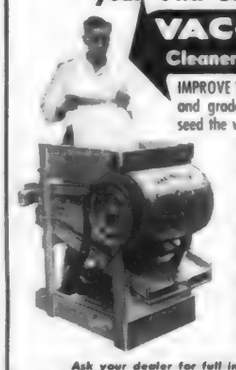

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that is why Raymond looks forward to a new day on his farm; he has a tractor.

### John Huguet

One of Chaussy Raymond's outlying parcels of land adjoins that of John Huguet. Huguet is the big farmer of the community and such are his methods, machinery and stock, that farmers around him make no secret of the fact that they envy him. He is an intelligent, well informed man who reads a great deal and enjoys the few luxuries the times will permit him to buy. He has 80 hectares of land, about 160 American acres, much above the average size of the French farm. It is unusual in that it is almost all in one continuous piece. His old father, who is retired, but lives with him, succeeded in buying and trading isolated pieces to consolidate his holdings, a remarkable piece of business acumen and diplomacy in France where farmers had been attempting to consolidate their isolated holdings for generations with little success. Huguet already has a tractor which he believes he received somewhat as an act of God. In 1940 a shipment of 13 tractors came into Montargis from America. In transit someone had stolen the tires so that the Germans had no use for them in Germany. They were impounded two years ago at the Liberation. After two years buried under bureaucratic red tape, tires were procured for them and they were released in the late fall of 1947 to the most needy farmers in the district. Huguet had been one of the lucky recipients. His new tractor is a Diesel, 36 horsepower and cost him $4.000, or 425.000 francs at the current exchange. He also has six horses, four cows, two calves, one bull and 300 ewes with 100 fall lambs. His wife thinks she has about 100 chickens. The farm is able to feed four hogs from table scraps plus a ration of beet pulp mixed with oats or barley, and hay. Of the 160 acres Huguet manages, 36 are in beets, 40 in wheat, 30 in luzerne hay, 30 in oats and 16 in barley. The remaining eight acres are in small strips of potatoes and second growth woodland. His beets this year yielded seven and one-half tons per acre, about two-thirds of the normal crop. The best crop of wheat he has had averaged 50 bushels per acre. This year it went as low as 30 because of the drought, although this section of France was not as hard hit as other parts. His hay will average two tons per cutting per acre and oats and barley about the same as good crops in America. For the first time since he has been managing this farm he planted foreign wheat, a shipment of Manitoba from Canada purchased from the Government Control. The 1947 crop of wheat was unfit for seed because of the drought. He has just purchased a purebred Southdown ram which he will cross with his fine Berrichon ewes. His cows are a mixture of Netherland and Normand stock. One of his Netherland cows is a very fine one and at the height of her lactation gives 30 quarts of milk


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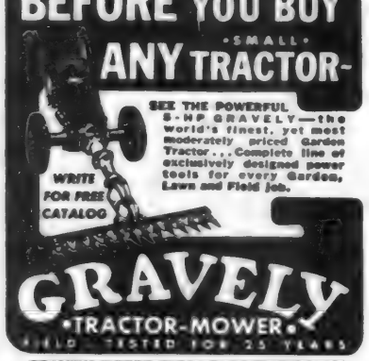

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per day. The other two cows give respectively 20 and 23 quarts a day. He feeds them luzerne hay and beet pulp mixed with chaff and hulls from the threshing. He also feeds them cow beets which he chops himself with a motor operated chopper. His farm is fairly well supplied with machinery, although some of it is wearing out. He has a McCormick reaper, a motor operated elevator to handle baled hay and straw, a Deere mower, a new Minneapolis-Moline disc, several pieces of planting and cultivating machinery made in Canada, and one or two pieces of French manufacture. His hay rakes, two-way plows and his cultivating machinery are of French manufacture.

### The French Earth

The soil in this district is very sweet and requires no lime. It is underlain by limestone rock and the soil itself is full of limestone pebbles. Huguet's fertilizer program calls for 250 pounds of nitrogen, 350 pounds of potash, 450 pounds of phosphate on each acre per rotation. This rotation varies from three to five years. In addition he puts on an estimated 15 tons of manure per acre on his beets. He says he believes in an entire year he will use close to a thousand tons of manure from his sheep, horses and cows. All the animals, with the exception of the sheep, are kept closely confined in the stables in order to produce manure to the greatest advantage. The straw from his wheat fields is baled and stacked up and used for bedding. He received for his crops last year 1800 francs for each 100 kilos of wheat, 3000 francs for each 1000 kilos of beets, 1400 francs for each 100 kilos of oats, 1600 francs for each 100 kilos of barley and 8000 francs for each 1000 kilos of hay. This, he is careful to explain, is very difficult to translate into terms of dollars for the simple reason that the franc has run the gamut of value in American money from two cents per franc to less than one-third of a cent. Roughly, the prices in American money are as follows: wheat, $2.70 a bushel; beets $15.00 per

THE BLACK SMOCK and the clipped head are the trademarks of the French schoolboy.


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ton; oats, $1.75 a bushel; barley, $2.00 a bushel; hay $40.00 per ton.

The wide variety of grasses and legumes grown in America for pasture and hay are unknown in France. They have done their experimenting long ago and settled on what is best for their land. The most popular forage crop is luzerne (alfalfa), which is almost exclusively grown in the wheat and sugar beet areas. There are some soybeans grown in parts and a little sainfoin, a legume hay unknown in America. Corn, or maize as it is known, is rarely grown except in a limited area in the South. The French people were recently

**THE DRILL follows the spike-tooth harrow, sowing the winter wheat in one of Chaussy Raymond's seven fields. As on so many French farms, his fields are not next to each other, but widely separated, with other farmland in-between.**

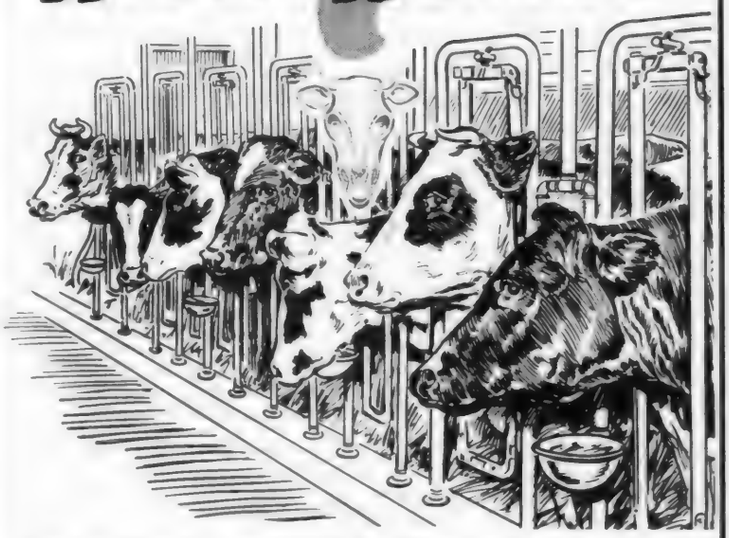
introduced to American corn meal, an introduction that was a disappointment to both the government and the housewife. In an attempt to supplement the short wheat supply, several cargoes of corn meal were brought in and distributed to grocers. The French housewife and the baker, who had never dealt with the strange foreign meal, were advised to mix with flour and proceed as usual. The result was a loaf of bread that would have been a very good substitute for a paving block. Some of the meal was well-populated with weevils and some was sour, which the French thought was the natural state of all corn meal.

Huguet employs five men permanently on his farm and pays them 40 francs an hour for a 10-hour day and furnishes food and lodgings. During the beet harvest he employs an additional four men who are paid by the acre for digging and chopping the beets. They make double the wage of the permanent worker. Last year Huguet grossed about $9000 on his farm. He has an ancient electric refrigerator which has not been used for three years because he cannot get repairs.

His rotation is elastic, and varies from year to year as the crop prices vary and as his land needs rest. This is typical: beats, wheat, oats or barley (sown with luzerne), luzerne two years then beets again. He very rarely pastures any animals but in the fall when the pasture growth warrants his shepherd takes his sheep out for a short time.

Neither Huguet nor Raymond are typi-


Which ONE is marked for "HIDDEN HUNGER"?



Sure, they *all* may be deep bodied, healthy producers and reproducers *today*. But . . . will they continue to be next month—next year? Or, will one, or *more*, be marked by:

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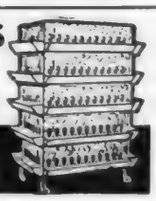

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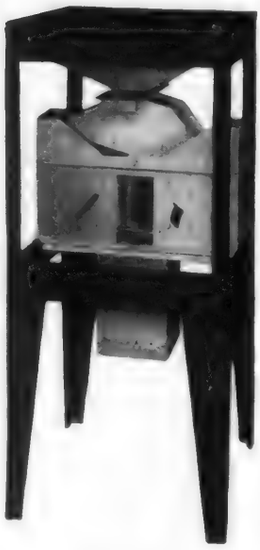

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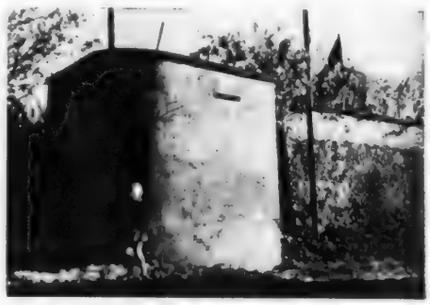
cal–French farmers, for there is as much difference between the Norman dairymen, the wheat farmer of the Bos, the grape grower of the Vendee, and the Brittany peasant with his dooryard farm, as there is between the Western ranchman, the Midwest corn and hog farmer, and the cotton plantation owner.

But if each is not typical in the way he makes his living from the earth, he is typical in his thrift, his attitude toward the



**SOUR NOTE in the peaceful rural scene is this concrete and steel pill box built by the Germans in an angle of an orchard wall.**

government and his fellowmen, and general outlook on life. To say that the French farmer is thrifty is a masterpiece of understatement. His thrift often verges closely on avarice and miserliness.

He is hard-headed, and he drives a shrewd bargain. But he is honest, and his door is open to the world. He treats the stranger with a rough but sincere courtesy. His thinking is logical and is tinged with a generous amount of what we here in America call horse sense. He is religious but not superstitious. Above all he loves liberty and he is an individualist. It has been said that a sure way to get a Frenchman through a door is to write above it, "Forbidden to Enter."

How the French farmer keeps up the fertility of fields which have been intensively cultivated for hundreds of years is a mystery to us here in America, where we face abandonment of farms not yet a century old. To the French peasant the answer is simple, direct, and crystal clear — put back as much as you take out. He has learned to take off a field only the grain—that part of the crop which he can sell or eat. All else, in the form of manure or crop residue, goes back, often in an enriched form. He does not delude himself into believing that since the grain is only a small part of the crop it will not be missed by the soil. This must return also. Whereas the American farmer will use as little fertilizer as possible, the Frenchman will use as much as possible. He arranges his rotation so that there will be a heavy crop of green manure to plow under every few years. He will cart leaves from the forest and from village streets, pulp from the beet mills, litter from the village dump, soil from the drainage ditch, everything that will enable him to close that thin margin between what he reaps from his fields and what he returns to them.

## HORSES ON THE FARM

(Continued from page 77)

should use horses, what farm should have a team and a tractor, or what multiples of each kind of power should be used. The man who finds his tractor grounded in the barn for several days in winter, when he knows a team could get out and work, or who needs power in a hurry in haying time to get the hay in before a summer storm. and finds his tractor tied up with the mower, will make up his own mind; he may feel a team is a low-cost solution.

A scientific approach to the problem has been made by the Wisconsin Agricultural Experiment Station and the Bureau of Agricultural Economics. They visited a total of 76 farms in representative parts of the state.

Records were obtained on the labor utilized, crops grown, livestock kept, machinery inventory and amount of exchange and custom work on all forms. On the 28 farms that had both tractors and horses, information was obtained on the age of the horses, feed fed to them and the horse work performed. Additional questions brought out information on the farmers' main reasons for continuing to keep horses, additional equipment believed essential if a shift were made to complete tractor and truck operation, and future plans for power and machinery.

"Yes," they say, "the average farmer can profitably afford to sell his last team." That is only general advice. It's qualified by the caution that this does not hold true if a farmer uses his horses 700 hours or more a year, or if selling the last team would require him to buy another tractor.

On the average, jobs done with teams cost 47 cents an hour last year. Horses eat, whether they work or not. The feed bill for a team of horses is now about $140 a year. Yet few farmers keep a work record of their horses. Some use their teams so little that the hourly cost runs as much as $1.00 an hour, or higher.

The average farmer uses his team less and less each year. Only one-third of the farmers interviewed in Wisconsin used their teams more than 60 days during 1946. That is the equivalent of 600 hours. It costs these farmers 40 cents an hour or less to use teams. The average farmer in Wisconsin uses his team 50 days a year. In Minnesota one group of farmers decreased their use of horses from 650 hours in 1941, to 530 hours in 1942, to 440 hours in 1943, to 410 hours in 1941, and to 380 hours in 1945.

Now, for the other side of the picture. The investigators have some favorable things to say about keeping a team of horses on the farm. If you have heavy wet land or steep slopes it often pays to keep a team in addition to a tractor. Many farmers also complain that the greatest drawback to horseless farming is the difficulty of changing much of the present tractor equipment required for specific jobs. For instance, with most tractors,

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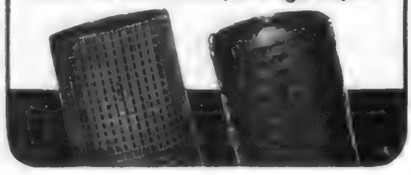

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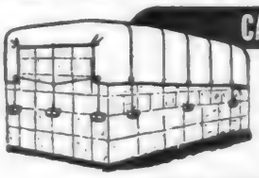

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changing from corn cultivation to mowing hay and back the same day, if there is only one tractor on the farm, would require half the time spent with a monkey wrench in hand. There also is the very important difference in how horse and tractor bills are paid. A team can be maintained on a non-cash basis, by raising the feed. Almost all tractor expenses are cash-out-of-pocket costs.

### The Small Farm

What about the small farm that has, say, $2500 a year net income? Can the man who operates this kind of farm afford to take his whole year's income and invest it in a tractor and tools? It will cost him approximately $3000 to buy a tractor and implements if he gets one in the 12 to 18.5 h.p. class. Studies made in 1946 show that the operating costs of tractors of this size were 60 cents an hour, made up of a fixed cost of 20 cents and an operating cost of 40 cents. If we use the same number of hours as we did for the team of horses we find that it will cost approximately $420 to run his tractor 700 hours per year. Since almost all tractor costs are cash costs for fuel, oil and repairs this means a sizable chunk of his cash that he will pay for getting the job done faster with his tractor. This will result in finishing up his work earlier in the evening. The decision the farmer will have to make is whether the money spent buying and operating a tractor could be better used for his family to live more comfortably, or whether the tractor is going to bring in more income which would make it a good investment. Many farmers would decide they could do better buying a $300 team. The team costs will be largely feed and services, items which are readily available on the farm. Twenty per cent of the total cost of horse power expense is estimated as the man-labor cost of caring for the horses.

A small but important return from the team of horses is the fertility building value of the manure they produce. At present fertilizer costs it would amount to approximately $32 a year for a team. The additional value of the organic matter of the bedding is difficult to estimate but it is an important item for soil which has been farmed heavily for many years.

### The Farm With Horses

Francis Eustis who farms a fine 400-acre rolling farm near Lebannon, Ohio, uses two tractors, and two teams of horses. He has a dairy and that means he has manure to spread every few days. He says, "I figure the horses here on Breezy Ridge Farm as a good half of our farm power requirements. I can spread the manure from the dairy just about any day in the year. Our manure piles up at the rate of three loads every two days, so we like to put it on the fields at least once a week. In the spring when the tractors are rushed getting corn ground ready we use the horses for the spreading and

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planting. I don't think farmers think the problem through when they say horses take too much time. Take the summer hay-time; I can load a full load of hay without jumping on or off a tractor seat a single time. The horses can be handled from the ground. Last fall we were hauling in shocked corn on December 1st for shredding. My neighbor, who doesn't have any teams, wasn't able to get in his fields with his tractor and wagon it was so wet: we had no trouble at all getting through with our teams."

Eustis believes in raising his own replacements too. He says, "One thing I like about horses is that they can reproduce themselves. In the time that we were wearing out one tractor, in eight years, we had this experience with one of our mares. I bought this registered Belgian as a four-year-old, for $475. Her first year filly sold for $400 as a two-year old. Her next year's stud colt sold for $250 as a three-year-old. The following year she had a particularly good stud colt. He sold for $500 as a three-year old, and he has not only proved to be a wonderful stud, but a fine worker and a winner at fairs wherever he has shown. We are still working this mare, and she is now 14 years old."

### Horses Are Almost Human

Like their masters horses are subject to an assortment of diseases. These ailments have scared many a farmer into mechanical power after some unfortunate experiences. A good proportion of these ailments can be prevented by proper care and feeding; and feeding horses seems to be more haphazard than with any other farm animal.

Many a farmer will study his available farm feeds to get the one mixture that will supply his dairy herd with a well-balanced ration most cheaply. Yet he may neglect to apply the similar principles to feeding his work animals.

The work horse's hay allowance should consist of approximately 1 to $1\frac{1}{5}$ pounds of hay per day per 100 pounds of live weight. Timothy, cereal hay, grass hay, alfalfa, clover and other legume hays are all good for horses. In the past many farmers thought alfalfa was not suited to horse feeding but many tests have shown it to be very palatable and healthful when fed alone. The basic requirement in feeding alfalfa is to limit the quantity; never feed over 1 pound daily per hundred pounds in live weight. Alfalfa is best too when it is cut when in half bloom, otherwise it may be too laxative for horses. Timothy of course is the standard hay for horses. It is easy to grow and is free from dust which is harmful to the horse's respiratory system. Mixed clover and timothy makes an ideal combination if it is green and free from dust.

Good pastures are important for all horses; they are essential for colts and brood mares. For early spring and fall pasture bluegrass is always excellent. Mixed


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pastures for summer grazing can be the same combination of legumes and grasses as for other farm animals. Farm horses should be turned in pasture whenever possible during the season to "harvest their own feed," and reduce labor and feeding cost. In hot weather they are always more comfortable in pasture at night than in the stable. Pasturing should be on a regular schedule if possible, and the horse that has not been on pasture should be introduced to it gradually. Wayne Dinsmore, Secretary of the Horse and Mule Association, Chicago, tells the story of a horse that had been kept in a stable for five years that was turned on pasture 24 hours a day, when bought by a new owner. He died in 5 days.

Oats is the old standby for feeding horses, but corn, barley, wheat, rye, grain sorghum can all be used in varying quantities and depending on the current price or supply on the individual farm. For exact feeding quantities Morrison's "Feeds and Feeding" should be consulted. Morrison lists the following feed combinations for horses of 1200 pounds weight:

*Heavy Work*

Grass hay 12 lbs., oats 16 lbs.

Grass hay 12 lbs., corn 13 lbs., linseed meal 1 lb.

Mixed legume hay 12 lbs., corn 13.5 lbs.

*Light Work*

Grass hay 16 lbs., oats 6 lbs.

Grass hay 16 lbs., corn 4.5 lbs., linseed meal .5 lb.

Mixed legume hay 16 lbs., corn 4 lbs.

Properly cured corn stover, bright oats or barley straw and sorghum fodder can be used for winter feeding horses. If stover or straw are fed chopped or shredded the following rations should be used for 1200 pound horses.

Shredded corn stover 8 lbs., legume hay 8 lbs., oats 5 lbs. Oat or barley straw, chopped 6 lbs., legume hay 10 lbs., oats 6 lbs.

Horses are generally fed morning, noon and night. The cost of maintaining idle horses can be reduced to practically nothing by allowing them to clean up meadows, stalk and stubble fields. Grain is fed only to keep the animals from getting in a run-down condition. They should be put on light grain rations a few weeks before spring work starts. Horses in fields need only a dry shed for shelter and plenty of water. The average year-round requirement of water per horse will be 10 to 12 gallons a day. He'll take more in the summer and less in winter.

C. J. Nobis and son, James, of Amelia, Ohio, have a large apple orchard, and their shiny new red Bean sprayer is pulled by one of their two teams. Joe Nobis says, "On our hills along the Ohio River we could not get to our trees for dormant spraying if we tried to pull the 3500 pound load of our sprayer and spray mix with our tractor. We could do it with a crawler tractor but we don't have one


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and the rest of our farming would not justify this expense.

"Farmers are getting lazy," says Nobis with a sigh. "The thing you'll hear them say most often is, 'It takes too much time to feed, harness and hitch up.' And that is a perfectly logical advantage that the tractor has over the team. It can be on its way in a minute, if the right tool is already hitched onto it. If cultivators must be attached or if a tractor is already in place there may be 10 minutes to two hours required to get under way. Horse-drawn tools do have the definite advantage of being seperate units complete in themselves, for their is no bolt attachment on the back of Dobbin. Generally too, a horse-drawn implement is less expensive to buy and maintain in repair."

Although the future for work horses is none too bright it looks as though they will continue to be the standby on the small, family subsistance farm where the cash involved in buying and maintaining a tractor and the various tools would be out of question. On larger, mechanized farms the horse will be essential for certain types of work on hilly or rough ground and during bad weather. But on many a Midwest farm teams will be replaced by speedy new tractors. And the farmers who love horses will ride them at an easy canter while watching their crops grow, checking up on erosion and just enjoying their company.

## THE POINTS OF A HOG

(Continued from page 37)

*A factor of show-ring importance and also great importance to the packer. This factor means little or nothing to the farmer as he gets paid for his hogs by the pound and does not receive a premium if his hogs cut out to better advantage; therefore, his primary concern is weight, put on as cheaply as possible.*

*Step III: Establishing a mental ideal.*

When learning to become a judge it is necessary to develop a mental picture of a perfect hog. This is done by thinking of the most desirable features of all the good animals which a person may have seen, and imaginatively combining them into one ideal specimen. When comparing animals in the ring the judge will then make his selections using this ideal as a mental guide. More specific points are taken into consideration than just the general appearance of the pig, however, as the various individual parts ofthe animals are considered in detail also.

*Step IV: Considering the major points.*

### Breeding Standards

When a judge selects breeding hogs the major points which he gives consideration are (1) conformation; (2) feet, legs and udder; (4) breed type and sex character.

*Conformation*—refers to the "type" of the animal. "Type", a much defined and discussed term, simply means the bodily

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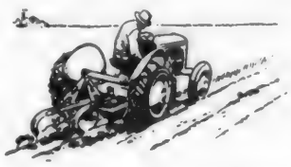

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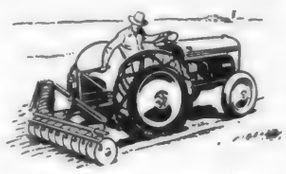

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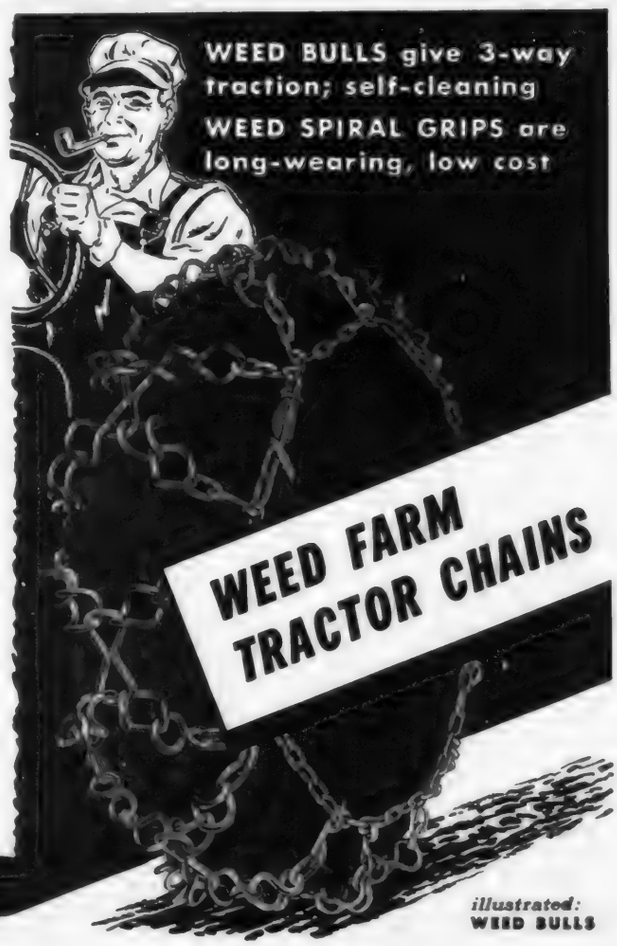
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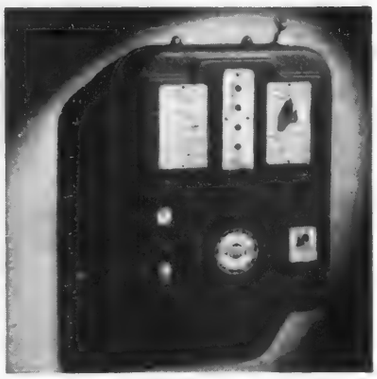

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shape of the animal. Desirable "type" or conformation, varies from time to time depending upon what the market demands. For this reason, before a judge can have an accurate understanding of selection he must be up to date on what the latest "style" hog is. At present the desirable type gilt should have good length, medium short legs, a deep body, smooth shoulders, deep plump hams, a strong back and trim jowl, with bone and hair of good quality.

*Feet, legs and udder*—Naturally more attention is given these points by the judge when he is selecting breeding stock than when judging animals that will soon be slaughtered. Breeding hogs should have straight legs with sufficient bone and quality. The pasterns should be short and straight, as long weak pasterns will break down when a sow gets older and heavier. Brood sows should have 12 well developed and sound nipples. Even in the selection of boars it is wise to see that he too has a dozen good "buttons" because the sire influences the teat development of his female off-spring. Swirls (whorls) are objectionable on all breeds and most associations will not register an animal carrying a swirl. Swirls in the hair on a hog's back are the the same as a "crown" on a humanhead; the hair grows out in a pinwheel pattern.

*BREED TYPE AND SEX CHARACTER*—It is important that animals clearly show the characteristics of their breed and sex. For example: Chester Whites, Spotted drooping ears, whereas Hampshires, Berkshires, Yorkshires and Tamworths have erect ears. Each breed has its own color characteristics which are easily learned.

Sex characters are marked by either femininity or masculinity. A boar should possess the strong virile appearance of a male; gilts and sows should display those more refined feminine characteristics indicative of motherhood. For example: a boar should have a strong and masculine head; a sow with a head displaying such characteristics would be said to lack femininity.

In the show ring a judge will disqualify such animals as "ridgling" boars as they are not a credit to any breed. A ridgling boar is a male hog that has only one visible testicle, the other testicle being retained inside the body cavity due to fauly physiological development. Even though retained in the body cavity and out of sight, the testicle is still functional.

**Market Standards**

When selecting market hogs the major points a judge will consider are (1) conformation; (2) condition; (3) quality.

*CONFORMATION*—Here, conformation means the same as it does in the case of breeding stock. The desirable conformation today for an ideal fat barrow is one with a strong well arched back, a wide loin, good spring of rib, straight underline, good length, medium short legs, smooth shoulders, deep plump hams and a trim jowl. As previously mentioned the "style"

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changes from time to time. The "style" mentioned above is the type hog the packing industry is promoting with great vigor at this time, a distinct change from the lardy type barrow which has been popular for many years.

*CONDITION*—This point is determined by the amount of fat the hog carries. It is the degree of finish. A good hog, that is ready for market, should be finished; therefore, this is an important point, which is given considerable attention by the judge when comparing hogs carrying different degrees of fatness.

*QUALITY*—This is determined largely by the appearance of the hair, hide, head and bone. Quality refers to the character of the hair, skin and bone and the general appearance of smoothness. According to the standard as shown by the score card the hair should be soft and silky, the skin smooth and free from roughness and the bone of medium size, dense and strong. The overall general appearance should be smooth and refined.

*Step V: Practicing with a system.*

Practice makes perfection! In no activity is this more true than in the selection of livestock. Practice and more practice is what it takes to be able to select animals with any degree of accuracy. Therefore, our man who is learning to judge animals spends hours practicing his art. As he does this, he looks at his animals with a definite system. The keen judge of livestock is always systematic, never haphazard. First he notes the general appearance and important details of each animal. Then he decides which animal most nearly measures up to his ideal; and, finally, he rates the other animals in the order of their decreasing merit.

*Step VI: Being able to tell why.*

In order that a judge may be able to speak intelligently regarding his ideas and reasons for selecting certain animals, a good working knowledge of swine terminology is necessary. Following is a vocabulary of additional terms which a good judge will use fluently when stating his reasons for any placing.

*CONFORMATION*—Terms of praise: Wider; deeper; more uniform in width; smoother side; stronger arch of back; more spring of rib; larger hams; plumper hams; free from wrinkles; deeper in the flanks; more scale and substance; stronger loin; smoother shoulders.

Terms of criticism: Fish backed; shallow bodied; narrow loin; cut up in the flank; too short legged; wasty jowl; rough shoulders; cat hammed; narrow throughout; too chuffy.

*CONDITION*—Terms of praise: More finish throughout; fatter; firmer fleshed hams; thicker covering over the loin.

Terms of criticism: Flabby along the underline; lacking in condition.

*DRESSING PERCENTAGE*—Terms of praise: Trimmer middle; less waste; will dress higher; deep meaty hams.

Terms of criticism: Paunchy; wasty

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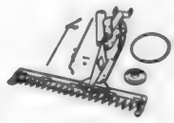

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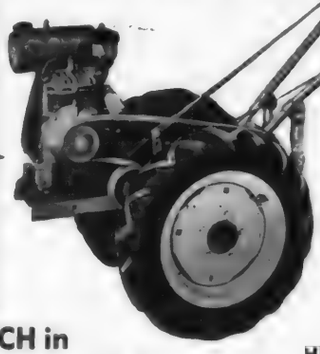

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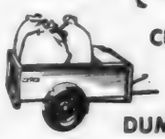

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The man who sets out to learn how to pick out a good hog, using scientific methods, will soon or later go through essentially the steps outlined above. If he possesses the average amount of aptitude, he will develop into a competent show-ring judge. Even though his methods and techniques are different from those used by the farmer hog raiser, in the final analysis they both come out with a good hog.

While the manner of arriving at a decision is different, the product is likely to be very similar. The two men will come close to picking the same hog for tops in any herd.

The show-ring judge goes about his job in the ring with showmanship and fanfare. The farmer quietly places his premium on the best hog in the lot. They are both contributing to the advancement of hog raising, and to the development of a better type of hog.

## FISH ON THE FARM

(Continued from page 45)

the county agent, SCS, state conservation department, or the U.S. Fish and Wildlife Service, Chicago, Illinois. Sources of fingerlings are state and federal hatcheries. In some states fingerling fish are free; in others the pond owner must pay for them.

The first fertilizer application should be made after the fish are in the pond. When the water is fertilized before the pond is stocked, predacious insects may congregate and feed on the fingerlings or fry as soon as they are put in the pond.

Catfish, crappie, and shellcrackers have proved fairly successful in combinations with bass and bluegills, but these variations differ with the locality.

When transferring fingerlings from the fish truck or can, the temperature of the water in the container should be about the same as that of the pond. If there is a big difference in temperature, water from the pond should be added to the container in small quantities at intervals of several minutes in order to slowly equalize the temperature. This step will sometimes take 30 minutes in cases of extreme temperature differentiations, but it should be done, or many fingerlings will die from shock.

Screens of quarter-inch mesh should be


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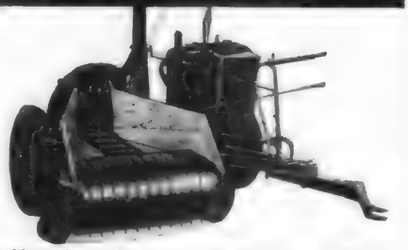

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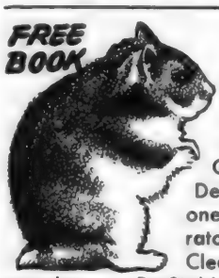

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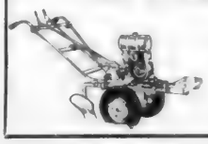

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placed against the spillway to prevent stocked fish from leaving a new pond. Debris will have to be removed from the screen periodically. The screens may be taken away when the stocked fish have become adults.

### Mosquito Control

State health departments in many southern states require *Gambusia* minnows to be placed in a new pond in addition to game fish species. These minnows assist in control of mosquitos if the pond is clear of weeds and floating matter. Small and pot-bellied, these top-water fish, which can usually be found in most old ponds in the South, reproduce rapidly. They consume mosquitos and their larvae and also serve as food for bass in the season the bass are stocked. After that, young bream will take over the task of mosquito control and Gambusia are then unnecessary.

Fishpond owners should not stock rough fish, such as roaches, suckers, dogfish and carp, which muddy the water or take the place of those that offer better food and sport.

One farmer closely followed recommendations of the county agent in building his pond. After that, however, he went on his own. For his fish he seined nearby streams and old ponds and dumped huge numbers of fish of all kinds and sizes in his new pond. Two years later he admitted defeat, drained his pond, and started afresh; but this time he followed stocking directions.

Old ponds frequently show the ill effects of improper stocking. An old pond is overcrowded if most of the bream are small and thin. This indicates there are insufficient bass to keep the bream in check. To correct this fault, 100 bass fingerlings for each acre should be added.

The opposite situation occurs where most of the bream are large and the bass small and thin. In this case the pond was initially overstocked with bass. Correction here is difficult. The best method is to fish heavily for bass or to seine out the bass and then fertilize properly.

Only in extreme cases should a pond be drained to correct its faults. This is generally necessary, however, when the pond has become infested with too many rough fish, which probably came from the stream running into the pond.

### How to Use the Fertilizer

Fertilization of ponds is being carried on in practically every state. Fertilizer can be used for three purposes: increasing growth and total yield of fish, controlling underwater weeds, and clearing ponds temporarily muddied.

How does fertilization affect the growth and fish life in a pond?

Plants furnish food for animals. Plants manufacture food and release oxygen, without which all animal life would perish.

Just as cattle existing entirely on pasture weight while grazing on fertilized fields,


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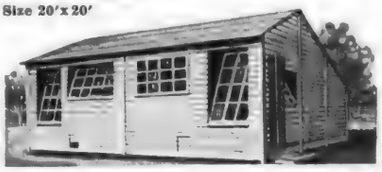

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fish in a pond also have more to eat when a pond is fertilized.

In a pond, fish can be considered livestock that pastures on minute water organisms. These tiny organisms are plants. Countless small animal organisms eat these plants. The animal organisms serve as food

THIS BLUEGILL will grow faster if the pond he lives in is fertilized regularly.

for smaller fish, which in turn, are food for larger ones. So that by fertilizing the plant life the fish ultimately will benefit.

Fertilizer application to a clear pond produces phenomenal results. Within a few days the water will turn a rich deep green or brown. This color, which is due to great numbers of water plants, may get so dense that little is visible below the water's surface.

Swingle and Smith recommend two types of fertilizer for ponds. One consists of a mixture of 100 pounds of 6-8-4 and 10 pounds of nitrate of soda for each acre. The other, which is recommended when 6-8-4 is not available or when a great quantity of fertilizer is required, is made up of the following for each acre: 40 pounds of sulphate of ammonia, 60 pounds of 16 per cent superphosphate, five pounds of muriate of potash, and 15 pounds of finely ground limestone.

Each of the above fertilizer combinations and amounts constitute one application. The U. S. Fish and Wildlife Service recommends 100 pounds of an 8-8-4 formula per application. This is the approximate equivalent of 100 pounds of 6-8-4 plus 10 pounds of nitrate of soda. The first application should ordinarily be made early in the spring when the weather gets warm. When a depth of 12 inches can be seen in the water, it's time for a second application. Ponds riled by flood waters should not be fertilized until flood danger is reduced. This is usually late in the spring.

For best results six to ten applications will be necessary during the growing season every year. Where the overflow is small, less fertilizer will be required than in ponds that have a large amount of water pouring over the spillways.

It's easy to fertilize a pond. If the pond is small, the fertilizer can be distributed by hand. There need be no attempt to put it in the middle of the small pond because wave action will carry it out.

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In large ponds of four or five acres, fertilizer can be spread from a boat.

Where clear water predominates in old ponds, fertilization will generally show a tremendous improvement in fish growth if followed at the rate prescribed for new ponds. The fish will increase in weight from three to five times.

Old ponds that are always muddy should not be fertilized. Fertilizer is of little benefit in any pond which loses a large amount of water during the growing season. Where fertilizer cannot be used, better fishing can be expected if the pond is drained, the fish removed, and the pond correctly re-stocked.

Barnyard manure is not recommended for any pond. A ton of manure will produce only about 40 pounds of fish.

Manure, however, is used for clearing water that is temporarily muddy due to wind action, heavy rains, or recent construction. A ton to an acre, applied two or three times at three-week intervals, will usually clear the water. A commercial mixture of 75 pounds of cottonseed meal and 25 pounds of superphosphate to the acre applied at two to three week intervals will also do the job, and in addition, will stimulate fish production. After the water has cleared, start the regular fertilizer program.

### Weeds Are A Headache

When Swingle and Smith began their experiments, pond weeds were considered good for the fish. Weeds were valued as a necessity for protecting fry. Experiments exploded these age-old theories.

Weeds are now regarded as pests in the pond the same as in the garden. They occupy space which could be used by fish. They snarl fishing lines. Weeds above water prevent free fishing from the bank and hinder effective mosquito control. True, they protect smaller fish from larger ones, but this often leads to overcrowding and stunted fish. It is a mistake to introduce water lilies and other flowering plants; you may sacrifice fish for beauty.

There are three types of weeds—submerged, emergent and floating. Submerged weeds, or those that grow entirely underwater, can be controlled in both old and new ponds by commercial fertilizer. The fertilizer so increases the microscopic plant growth that its density makes a shade and prevents growth of submerged weeds. The best fertilizer is the mixture of 100 pounds of 6-8-4 and 10 pounds of nitrate of soda for each acre per application. This fertilization should begin while the water is still cold just before the weather begins to warm up in early spring.

Broadcast the fertilizer over the weedbeds. Following the first application, two more are made at two-week intervals. Further applications are made three weeks apart until the weeds become covered with algae or "pondscum."

Afterwards, the stems break and the weeds float to the surface. When large

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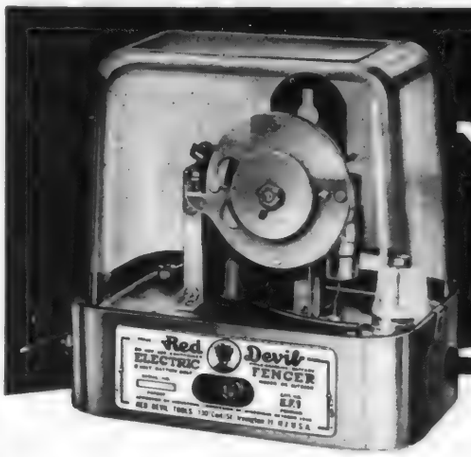


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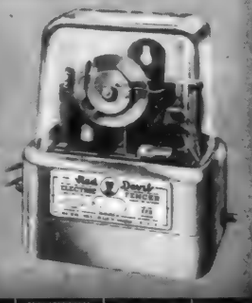

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masses of these weeds and scum cover the water, usually during spring and early summer, no additional fertilizer should be applied. At this time the weeds are decaying rapidly; additional fertilizer may cause too rapid decay, which will exhaust all oxygen in the water and eventually suffocate the fish. The decaying plants will release nutrients to the water to promote plankton growth and in some cases no more fertilizer is required for the remainder of the year. Fertilization, however, should be resumed when objects can be seen in water 12 inches deep.

Emergent weeds, such as spatterdock, yellow waterlilly, common waterlilly, lotus, or water chinquapin, watershield, and floating pondweeds, should be removed by hand from the new pond when they appear. A garden rake is often handy for this purpose. In old ponds this type of weed may also be removed by hand or cut as often as it appears. Draining a pond to kill weeds is not recommended. Sodium arsenite and copper sulphate solutions are suggested by the Fish and Wildlife Service specialists for weed control. Use of these chemicals, however, entails a possible risk of killing fish. The new weed-killer, 2,4-D, may prove effective in pondweed control in the future. Its results are being studied at the present.

Cattails, bulrush, needle rush, and spike bush form dense growths in shallow water and should not be permitted in either new or old ponds. Water hyacinth and the true floating weeds, such as duckweeds, should also be removed.

### Then Go Fishing

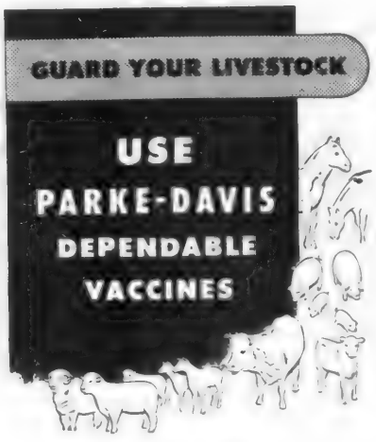
In a new pond that has been stocked and fertilized you can start fishing toward the end of the first year. This permits remaining fish to grow to a larger size.

A comparison with a field crop will give the picture. If corn is thickly planted in rows close together and not thinned stalks will be stunted, and the yield will be nubbins. If the corn, however, is planted in wide rows and thinned intelligently, big big healthy stalks heavy with long ears can be expected. When not crowded, each stalk has access to a plentiful supply of nutrients.

If no fish are removed from a fishpond, growth of individuals will be slow. "Thinning out the fish" with hook and line will enable the remaining fish to grow larger because more food is available.

One of the first questions that comes up is how much fishing should be permitted? Only 50 to 60 per cent of the total weight of fish in a pond should be removed each year. It has been discovered, however, that heavy fishing can account for this percentage in a short time. Fishing and amounts of fish taken from a pond should be regulated to spread the sport over the entire season.

In all ponds there are cycles of good and poor fishing. Fishing is better when the food is scarce in a pond. When a large number of fish is taken out, the food re-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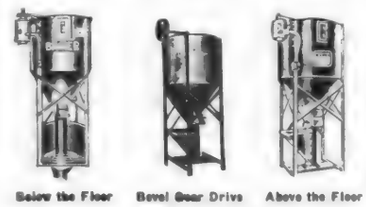


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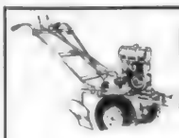

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maining in the pond will be so abundant that the angler's bait will be ignored. Later, when the natural food in the pond has been consumed, fishing will again improve. This accounts for cycles in good fishing. The expert fisherman can usually have "good luck" in poor fishing periods by varying his lures. Then, of course, there is always the fellow with the "fishing touch" who can bring home a string of fish on a day "when they aren't biting."

Although some state conservation laws now permit owners of private ponds to sell freshwater fish legally on the market as food, most farmers prefer to make their profits through the sale of fishing permits and rights. Last year fishing rights to 70 ponds in one southern state amounted to $23,714.

A. C. Whatley has a 200 acre farm near Muscle Shoals, Alabama, on which he built a small fishpond a few years ago. The pond is approximately an acre in size. He stocked it with the proper number of bluegills and bass. Every year he fertilizes it.

To make the pond pay in full in recreational opportunities, he constructed a lodge for himself which is a sportsman's dream. Located beside the pond it is fringed with tall whispering pines. The lodge has running water, a bathroom, and electricity. It makes a good place for farmers' community meetings. When the group gets tired of talking they can always change into bathing suits, dive in and cool off.

### The Rules Are Changing

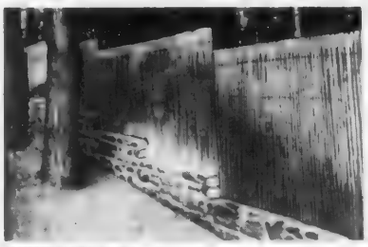
Some states have now removed all restrictions on size and number of fish which can be legally kept. This radical change is explained in the fact that taking of small fish has little effect on the total supply. Sportsmen in the future may throw away their rulers. In addition, there are experiments under way with year round open seasons.

Farm ponds are proving valuable in many ways. During times of high water, fish from stocked ponds go over spillways into the pools and rivulets below. In one experiment 6,882 small fish left a 1.5 acre pond in a period of eight months. Sometime large fish go over the spillway along with the fry, to restock the streams below.

Some farmers are planting their gardens below pond dams, for moisture due to seepage is sufficient to keep vegetables well supplied in months of drought.

Many farm ponds which were built to supply water for livestock or orchard spraying have become just one more way to keep the children happy and satisfied with farm life. And as one old farmer in central Missouri said recently: "It's not a bad idea at all to have a spot on your own land where you can take a one hour vacation whenever you feel like and be pretty certain you won't have to come back and explain why you didn't catch any."


FENCES FOR EVERY PURPOSE



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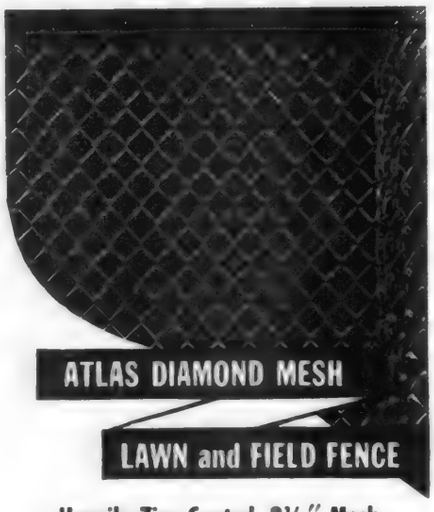

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## THE BILL FOR HORACE'S BULL

(Continued from page 32)

the point and bring up the business which had brought him over would have been a grave breach of manners in our neighborhood.

Horace covered the weather pretty thoroughly, and skimmed through crop prospects. He mentioned the health of several ailing neighbors and finally got around to his bull. We had seen Horace's bull; at least that is what Horace called him. He looked like a bad caricature of Ferdinand; wicked little head with vicious red eyes and short, stubby legs. His rump skidded off suddenly from the saddle like a ski run and he had a skinny chest and underneath was hung a great kettle of a belly.

"Yes, sir," said Horace, "he's some bull. He's got Holstein and Guernsey and Brown Swiss into him, and maybe some of this here Black Anguish."

As Horace closed his paen of praise for his bull of many colors, he fished a paper out of his pocket.

"I just happen to remember I've got a little bill for you here." So that was it. Horace was up to his Yankee tricks again. "A bill? We paid you for the pasture rent, and for feeding the heifers. I've got the receipt here, and the cancelled check." Horace arranged his face in an embarrassed grin. "Oh, sure, that's all right; this is something different. You see, that bull of mine is a great jumper. He got so he could go right over the top of that barbed wire fence without touching it."

"I guess he bred all four of your heifers. Usually I charge a dollar apiece for breeding fees, but seeing as how those heifers are something special I'll have to charge a little more; say six dollars for the lot. That be all right with you?"

We stood speechless. As we say around here, "Horace had knocked our props out from under." Our heifers would produce, some time around mid-summer, mongrel calves, worth nothing except as veal. It would put our whole breeding program back a full year. And here was Horace handing me a paper on which he had scrawled, "Breding 4 heffers . . . $6."

"Horace," I said, "I think you had better be getting home. I've just had some very bad news, and I'm pretty much upset. As for your bill, I'll take care of that right now." I slowly tore it into small pieces and tossed them into the grass. "You ought to know better than to try anything like that on me!"

Horace grinned uncertainly. "Well, can't blame a feller fer tryin', can you?"

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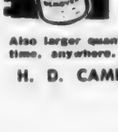


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# ADVERTISERS' INDEX

## SPRING, 1948


AC Spark Plug ..... 118
Aeroil Products Co. ..... 142
Agricultural Laboratories ..... 96
Allied Mills, Inc. ..... 9
Allis-Chalmers Co. ..... 13
American Aberdeen Angus ..... 136
American Berkshire Ass'n ..... 92
American Brahman Breeders' ..... 106
American Chain & Cable Co. ..... 133
American Chemical Paint Co. ..... 137
American Corriedale Ass'n ..... 138
American Guernsey Cattle Club ..... 135
American Hampshire Sheep Ass'n 130
American Hereford Ass'n ..... 117
American Jersey Cattle Club ..... 99
American Milking Shorthorn Ass'n ..... 142
American Polled Shorthorn ..... 110
American Shorthorn Breeders' ..... 104
American Steel & Wire Co. ..... 107
Anchor Serum Company ..... 92-142
Arcady Farms Milling Co. ..... 124
Ariens Company ..... 111
Atlas Fence Company ..... 142
Automatic Equipment Co. ..... 132
Babson Bros. ..... 4
Bell Company, C. S. ..... 96
Belsaw Machinery Co. ..... 105-132
Bendale Farm ..... 100
Biltmore Farm ..... 137
Boyt Harness Company ..... 130
Brendy Tractor Company ..... 97
Brillion Iron Works ..... 104
Bolens Products Co. ..... 135
Burnett Bros. ..... 124
Bussey Products Co. ..... 130
Campbell-Hausfeld Co. ..... 94-111
Campbell, H. D. ..... 142
Canadian Jersey Breeder ..... 98
Champion Nurseries ..... 96
Chewalla Sanitary Brooder ..... 127
Clayton & Lambert ..... 93
Clinton Machine Co. ..... 139
Continental Motors ..... 122
Crown Barn Cleaner Div. ..... 12
Cunningham & Sons Co., J. ..... 100
Dearborn Motors ..... 114-115
Deere & Company ..... 11
Doane Agricultural Co. ..... 104
Dow Chemical Company ..... 10
DuBois Fence & Garden Co. ..... 102
Early & Daniel Co. ..... 131
Eastern Tractor Company ..... 108
Electric Auto-Lite ..... 113
Electra Protection Co. ..... 130
Farm Labor Saver ..... 126
Fate-Root-Heath Co. ..... 112
Featherland Farm ..... 136
Ferrell & Company, A. T. ..... 128
Firestone Tire & Rubber Co. ..... 3
Ford Motor Company ..... 2
Fox River Tractor Co. ..... 123
Fuerst Stock Farm ..... 126
Fulton, Claude G. ..... 136
Fulton Manufacturing Co. ..... 140
Garden-All Tractor Co. ..... 106
Golden Arrow Farm ..... 140
Gravely Motor Plow ..... 126
Gulf Hamstery ..... 136
Hance Mfg. Co., J. W. ..... 124
Handy Chart Co. ..... 96
Harris, L. R. ..... 140
Hauck Mfg. Co. ..... 105
Have-More Plan ..... 109
Hudson Mfg. Co., H. D. ..... 143
Indiana Corn Growers ..... 140
International Ass'n Ice Cream Mfgrs. ..... 94
International Harvester Co. ..... 1
Iowa Hereford Ass'n ..... 12
IXL Pump Mfg. Co. ..... 132
Jari Products ..... 104
Keeling Nursery ..... 130
Kelsey Nursery Service ..... 126
Kemp Mfg. Co. ..... 126
Lakewood Farm ..... 130
Louthardt, H. ..... 98
Lincraft, Inc. ..... 92
Lodge-Shipley ..... 98
Louden Machinery Co. ..... 129
Martin Steel Corporation ..... Third Cover
McBride, H. E. ..... 138
Merchants Creamery ..... 111
Midland Company, The ..... 6
Miller Electric Mfg. Co. ..... 131
Miller Manufacturing Co. ..... 102
Minneapolis-Moline Power Co. ..... Back Cover
MontaMower ..... 94
Moto-Mower ..... 110
Mulkey Company, Sam ..... 111
Musser Forests ..... 128
Myers & Bro. Co., F. E. ..... 96
National Band & Tag Co. ..... 126
National Poultry Institute ..... 110
National Spotted Poland China Record ..... 137
National Turkey Institute ..... 94
Nears Food Company ..... 127
New Holland Machine Co. ..... 116
New Idea Farm. Equipment Co. ..... 8
Nitragin Company ..... 136
Northeastern Aberdeen Angus ..... 136
Nutritional Research Co. ..... 126
Oliver Corporation ..... 121
Oshkosh Filter & Softener ..... 98
Ottawa Steel Products Co. ..... 120
Owensboro Ditcher & Grader ..... 98
Papec Machine Company ..... 136
Parke-Davis & Co. ..... 140
Parks & Sons, J. ..... 126
Perfection Steel Body Co. ..... 105
Phelps Dodge Refining Co. ..... 100
Plymouth Rock Squab Co. ..... 92
Prime Mfg. Co. ..... 134
Queen City Supply Co. ..... 96
Quitman Seed Co. ..... 140
Rapids-Standard Co. ..... 108
Rectifier Engineering Co. ..... 132
Red Devil Tools ..... 139
Riley Laminated Products ..... 99
Rocknoll Nursery ..... 110
Rogers Nurseries ..... 137
R. P. M. Mfg. Co. ..... 103
Rusticraft Fence Co. ..... 141
Ryan Aeronautical ..... 94
Schafler, Nat. ..... 138
Schraders Sons, A. ..... 102
Scott & Sons, O. M. ..... 133
Scottdel, Inc. ..... 140
Seagram Co., Joseph E. ..... 7
Seaman Motors ..... 92
Security Mfg. & Contracting Co. 101
Sherwin-Williams Co. ..... 125
Skinner Irrigation Mfg. Co. ..... 110
Smith Agricultural Chem. Co. ..... 112
Smith & Company, D. B. ..... 132
South Michigan Nursery ..... 138
Spohn Medical Co. ..... 111
Squibb & Company, E. R. ..... 119
Starline, Inc. ..... 97
Strout Realty, E. A. ..... 102
Sudbury Laboratories ..... 144
Tennessee Corporation ..... 134
Thomas, Milton R. ..... 132
Tobacco By-Products Co. ..... 142
Tokheim Oil Tank & Pump Co. ..... 95
Tompkins, Harold ..... 98
Tow Path Farms ..... 138
Townsley Trapnest Farm ..... 100
Trans Continent Supply ..... 100
Vermont Evaporator ..... 98
Victor Animatograph ..... 120
Vogel Company, J. A. ..... 110
Warrick, Roy B. ..... 130
Waters Conley Company ..... 104
Willoughbys, Inc. ..... 141
Willow Brook Farm ..... 138
Wilson Refrigeration ..... Second Cover
Woodbine Farm ..... 138
Wood Products Company ..... 105
Wyant, Melvin ..... 94
Young, E. C. ..... 137



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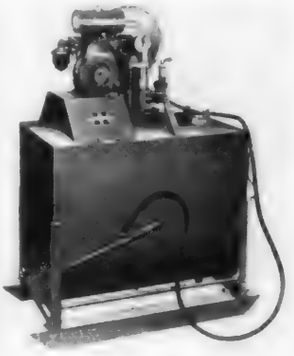
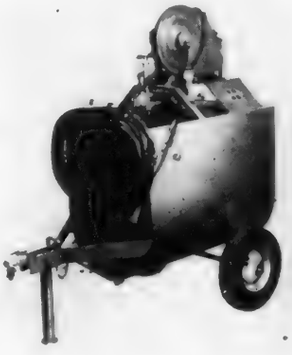
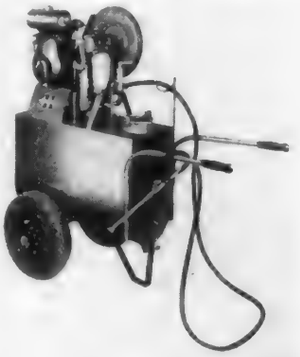


New Hudson skid-mounted Power Sprayer. Discharge capacity 4 gallons per minute. 100 gallon tank. Also available in 2 gallon per minute capacity with 30 or 50 gallon tank.

New Hudson pneumatic-tire Power Sprayer with trailer hitch. Discharge capacity 4 gallons per minute. 100 gallon tank.





New Hudson pneumatic-tire Power Sprayer. Discharge capacity 2 gallons per minute. Available with 30 or 50 gallon tank.

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## LETTERS — Continued from page 113

### CROSS BRED RESULTS

Sir:

I believe that your article on cross breeding is the best which has appeared in any of the farm publications and want to congratulate you. Readers of Farm Quarterly specializing in dairy, might be interested in looking at five of Colonel Prentice's cross breeds which were shipped to me by Colonel Prentice last fall. One of these cross breeds (Guernsey, Holstein, Ayrshire), has produced 15,105 lbs. of milk and 752.8 lbs. of butter-fat in 270 days, milking twice daily and with a maximum 16 lbs. of grain daily. If you will convert this production into the usual 3 times milking, 365 days, you will find that this cross breed is well up among national leaders in butter-fat production.

ROB'T. H. MURRAY
Valparaiso, Indiana

### GROUNDING STEEL BUILDINGS

Sir:

Since steel buildings are subject to connect with lightning discharge it is obvious that the building should then be grounded. It is our understanding that the Fire Underwriters Inspection Bureau suggests grounds on opposite corners of a steel building to consist of a minimum of the capacity of a ¾" galvanized water pipe about six feet deep.

Electric grounds of the same size galvanized water pipe should be eight feet deep minimum.

Electric grounds and building grounds to discharge lightning should not be located closer than six feet from each other.

Both types of grounds should preferably be placed near building water drains so that the ground would be more likely to be moist.

Lightning grounds are usually of a type that do not need a mechanical protection. However most electric grounds do need such a protection. If the mechanical protection consists of a metallic pipe through which the ground conductors run then there should be a solid connection between the ground connection and this pipe, both at the top and bottom of such mechanical protection. The reason for this is that a pipe acts as a choke.

Sheet metal buildings or buildings partially constructed of steel should be so bonded that there is a definite path through all steel units to ground. These bonds should provide a direct path since lightning does not easily make right angle turns.

In this north central area our barns are enclosed. All buildings containing animals are considered as being moist. We, therefore, desire to select a type of wiring materials suited for moist buildings. "BX" is not a good material for this type of work. Conduit, if used, should be protected against deteriorations. Many electric contractors are not fast workers with conduit. Those committees working with electric wiring prefer to recommend either knob and tub wiring or non-metallic sheathed cable wiring in order to keep the cost of getting a good wiring system as low as possible.

Manufacturers do produce a rat proofed and moist proofed non-metallic sheathed cable. Most cable coming into this area is rat proofed. We have not been able to get the moisture proofed cable in the quantity which we would like.

MARVIN NABBEN
Agricultural Engineer
Northern States Power Co.
Minneapolis, Minnesota

### PASTURES

Sir:

There is one subject on which you have only just barely touched, that of Pastures and their management which, I am sure, will open the way to all of your readers to means of increased fertility of our land. I am not an authority on the subject, but an ardent student. My own investigation has led me to believe that the Department of Agronomy, Cornell University, Ithaca, N. Y., has progressed the most in this subject in our country. I have found a wide variation in the practice followed in the various state agronomy departments, as well as wide variation of opinion on the subject among the practical farmers in any section. The principle of the "long leg" of grasses and perennial legumes and a system of rotation built around the pasture and hayfields is the identical principle in any country or climate when slightly altered to meet the local condition. The use of pasture management to take nitrogen from the perennial legumes, and then supplement the free nitrogen taken from the air with the application of not less than 600 lbs. per acre of super phosphate and 100 lbs. per acre of muriate of Potash, every four or five year, is the basis of the greatest fertility at the least expense.

All of my friends join in my praise and wish your issues were more frequent.

PAUL LLEWELLYN
Rectortown, Fauquier, Co., Va.
Colonel, A.U.S.

### THANKS, JACK

Sir:

I am ten and wish to be a farmer when I grow up. I get the Farm Quarterly all the time, and enjoy it very much. I wish to see appear in the Farm Quarterly something about Saddle horses. I study farming.

Jack Mount
18542 Dale Avenue
Detroit 19, Michigan

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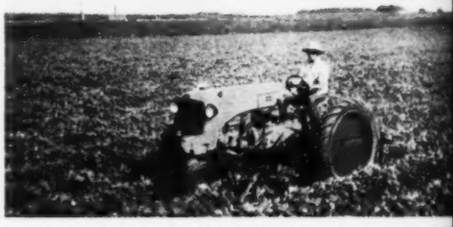

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